**energy**

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**TÜRKİYE - RENEWABLE ENERGY INTEGRATION (REI) INVESTMENT PLAN**

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**List of Abbreviations**

|  |  |
| --- | --- |
| AKP | Justice and Development Party  |
| AMI | Advanced Metering Infrastructure  |
| ASA | Advisory Services and Analytics |
| BAU | business-as-usual  |
| BESS | Battery Energy Storage System |
| BOT | Build Operate Transfer |
| BOTAS | Petroleum Pipeline Company |
| bps | basis points  |
| C&I | commerce and industry |
| CAGR | Compound annual growth rate |
| CBAM | Carbon Border Adjustment Mechanism |
| CBRT | Central Bank of Republic of Türkiye |
| CCDR | Country Climate and Development Report |
| CIF | Climate Investment Fund  |
| COP28 | United Nations Climate Change Conference |
|  COVID-19 | Coronavirus Disease 2019 |
| CPF | Country Partnership Framework |
| CPI | Consumer Price Index |
| CTF  | Clean Technology Fund |
| DSI | State Hydraulic Works General Directorate |
| EBRD | European Bank for Reconstruction and Development |
| ECA | Europe and Central Asia |
| ECARES | Europe and Central Asia Renewable Energy Scale-Up  |
| EEPB-2 | Second Energy Efficiency in Public Buildings  |
| EEX | European Energy Exchange |
| EIIE | Implementing Entities |
| EML | Electricity Market Law |
| EMRA | Energy Market Regulation Authority |
| ENTSO-E | European Network of Electricity Transmission System Operators  |
| EPIAS | Energy Exchange Istanbul (EXIST) |
| ETL | electricity transmission lines  |
| ETS | Emission Trading System |
| EU  | European Union |
| EUAS |  Electric Generation Corporation |
| EUAS | Electricity Generation Corporation |
| EV | Electric vehicle |
| EXIST | Energy Exchange Istanbul |
| FIT | Feed-in-Tarif |
| FX | Foreign Exchange Market |
| GCAP | Global Climate Action Program |
| gCO2 | Grams of carbon dioxide equivalent  |
| gCO2 | Grams of carbon dioxide equivalent  |
| GDP | Gross Domestic Product |
| GHG | Green House Gas |
| GoT | Government of Türkiye |
| GSEP | Gas Storage Expansion Project |
| GW | gigawatt |
| HPP | Hydro-electric Power Plant |
| HPP | Hydro Electric Plant |
| HVAC | high voltage alternating current  |
| HVDC | High Voltage Direct Current |
| IBRD | International Bank for Reconstruction and Development |
| IEA | The International Energy Agency |
| IFC | International Finance Corporation |
| IGOs | Intergovernmental organization |
| ILO | International Labor Organization |
| IP | Investment Plan |
| IRA | Inflation Reduction Act |
| IRF | Integrated Results Framework  |
| ktoe | ton of oil equivalent |
| LCPs | low-carbon pathways  |
| M&R | Monitoring and Reporting |
| MDBs | Multi Development Banks |
| MIGA | Multilateral Investment Guarantee Agency  |
| MoEN | Ministry of Energy and National Resources |
| MoEUCC | Ministry of Environment and Climate Change |
| MoTF | Ministry of Treasury and Finance |
| MoTI | Ministery of Treasureary and Infrastructure |
| MoU | Memorandum of Understanding |
| MPA | multiphase programmatic approach  |
| MSME | Micro, Small, and Medium-sized |
| MTEP | million-tones equivalent of petroleum |
| MÜSİAD | Independent Industrialists and Businessmen's Association |
| MWh | Megawatt‐hour |
| NDC | National Determined Contribution |
| NDP | National Development Plan |
| NEEAP | National Energy Efficiency Action Plan |
| NEP | National Energy Plan  |
| NGOs | Non-governmental Organizations |
| NØW | Near Zero Waste  |
| OIZ | Organized Industrial Zones  |
| OTC | Over the counter |
| SCADA | Supervisory Control and Data Acquisition |
| SME | Small and Medium Enterprises |
| SOE | State-Owned Enterprises |
| SuTPs | Syrians under Temporary Protection |
| TA | Technical Assistance |
| TOE | Ton of Oil Equivalent |
| TRY | Turkish Lira |
| TwH | Terawatt |

# [I. Executive Summary](#_I.__Executive)

Türkiye has significantly reformed its electricity market, transitioning from a monopolistic to a competitive structure. Since the enactment of the Electricity Market Law (EML) in 2001 and its amendment in 2013. The EML created the Energy Market Regulatory Authority (EMRA) by extensively defining its organization and duties; introduced a new licensing requirement for the electricity market, eligible consumers, licensing, regulated grid access; and separated the activities into regulated sectors (transmission, distribution, retail sales) and competitive sectors (generation, wholesale, retail sales to eligible customers).

The 2005 Renewable Energy Law (REL) has been amended to enhance regulatory support and encourage investment in renewable energy. Notably, incentives for renewable energy include floor prices, priority dispatch, and Feed-in Tariffs (FITs), which were initially set in US$ in 2011 and later adjusted to Turkish Lira (TRY) from 2020. Additionally, the Renewable Energy Zones (YEKAs) law facilitates auctions for generating electricity in high-potential solar or wind areas, awarding provisional licenses to the lowest bidders. By end-2023, Türkiye 's total installed capacity reached 107 GW, with a significant share from renewables. Renewable energy installed capacity has increased from 28 GW by end-2001 to 59 GW by end-2023, with an increase of 114 %, owing to the investments made mostly by the private sector.

Over the past two decades, Türkiye has seen the highest surge in energy usage among the Organization for Economic Co-operation and Development (OECD) countries. Despite this fact, the country has effectively improved its energy efficiency, evidenced by its ranking as the second-best in reducing energy intensity within the OECD in 2021.

Türkiye's greenhouse gas emissions, mainly from the energy sector, increased by 7.7% in 2021. The government updated its National Determined Contribution (NDC) to reduce emissions by 41% by 2038, starting in 2023. Türkiye issued a Green Deal Action Plan in July 2021, Plan with regard to transition towards a sustainable, resource-efficient economy, aligning with the European Green Deal, focusing on carbon border adjustments, green finance, energy supply, sustainable agriculture, transport, and climate diplomacy. A Green Deal Working Group was established to monitor the plan's implementation. The government ratified the Paris Agreement in October 2021, committing to net-zero emissions by 2053 and pushing forward resilient decarbonization plans. Efforts are underway to implement an Emission Trading System (ETS) to control emissions and maintain trade relations with the European Union, in line with the EU's Carbon Border Adjustment Mechanism (CBAM). A partnership with the World Bank has been formed to develop the ETS, with plans to pilot the system in 2024. Additionally, Türkiye's energy exchange, EPIAS, will collaborate with EEX to ensure compatibility with EU practices.

The National Energy Plan (NEP), issued by the government in December 2022, has set ambitious targets to scale up renewable energy and flexibility resources by 2035. The 12th National Development Plan (NDP, 2024-2028) outlines a comprehensive agenda to transform Türkiye 's economy in line with climate goals, focusing on immediate actions until 2028. Recent initiatives, including the 12th NDP and the National Energy Efficiency Action Plan (NEEAP, 2024), form a cohesive strategy to overhaul the nation's economic structure to meet climate objectives. These efforts are part of Türkiye's broader commitment to a sustainable and climate-resilient future, with a Long-Term Decarbonization Strategy under development to detail further climate actions. Türkiye's energy strategies, outlined in the NDP, Medium-Term Program, NEP and NEEAP, prioritize local and renewable energy sources (particularly solar and wind), advance domestic energy technologies, improve energy efficiency, and enhance Türkiye’s role in the global energy market.

During 28th United Nations Climate Change Conference (COP28), Türkiye announced a plan to expand solar PV and wind power capacity by 60 GW by 2035, aiming to lower electricity costs and reduce reliance on fossil fuels, enhancing industrial competitiveness and growth. Plans include increasing wind power capacity to 29.6 GW (24.6 GW onshore and 5 GW offshore) and solar energy capacity to 52.9 GW by 2035. Hydroelectric power plants are expected to reach 35.1 GW, and geothermal and biomass power plants 5.1 GW.

The World Bank's Country Climate and Development Report (CCDR) on Türkiye, published in June 2022, outlines a practical approach for the country to transition to net-zero emissions, promising substantial economic, social, and environmental gains. The World Bank's involvement in Türkiye aligns with the CCDR's suggestions, with an existing energy portfolio of nine projects totaling over $3 billion. The World Bank’s energy sector portfolio consists of four projects that contribute to enabling renewable energy capacity (Renewable Energy Integration, Geothermal Development, Public and Municipal RE and Accelerating the Market Transition for Distributed Energy), four in energy efficiency (Energy Efficiency in Public Buildings - 1 and 2, Seismic Resilience and Energy Efficiency in Public Buildings, Organized Industrial Zones) and one in the gas sector (Gas Storage Expansion Project – GSEP). In 2023, these projects have already facilitated the generation of 956 MW of renewable energy, with an expectation to contribute to 2,273 MW by 2028. Additionally, three technical assistance projects have been recently approved, two under European Union (EU) IPA II - Phases 3 and 4, and one to support PMI. The World Bank’s decarbonization program is set to grow with a new pipeline including Transforming Power Transmission System for REI Projects– Phases 1 and 2 (IBRD US$1.5 billion in total, FY26 and FY28).

The International Finance Corporation (IFC) has invested over $3 billion in Türkiye to support private sector projects that enhance energy generation, efficiency, and climate change mitigation. This includes 10 power generation projects with a capacity of 4.3 GW and distribution projects benefiting 3.9 million customers. These investments, in line with the World Bank reforms, have fostered innovation and market creation, leading to more reliable electricity, economic growth, and higher labor force participation. IFC is committed to financing power generation to meet Türkiye's future energy demands and to strengthen the distribution network to better integrate renewable energy and enhance resilience. Following the approval of the World Bank Country Partnership Framework FY24-FY28 in April 2024, IFC, along with IBRD and MIGA, plans to continue supporting renewable energy projects and the modernization of transmission and distribution networks. IFC is also focused on promoting the adoption of new clean technologies, including battery storage energy systems, to increase renewable energy generation, diversify the energy mix, and improve the resilience of the power system in Türkiye.

Over the past decade, the European Bank for Reconstruction and Development (EBRD) has invested EUR2 billion in 30 energy sector projects in Türkiye, encompassing renewables, energy efficiency, and power distribution. The EBRD's total investment in renewables amounts to EUR9 billion, including significant solar and wind projects, and a major geothermal plant that boosted Türkiye's geothermal capacity by 30%. These investments have also enhanced human capital by fostering green and digital skills through nationally accredited certifications and promoting workforce diversity via Equal Opportunity Action Plans. Additionally, the EBRD has worked with local authorities to support economy-wide decarbonization, helping to develop the Renewable Energy Action Plan aligned with the EU's directive, design post-2020 renewable energy support schemes, and formulate the National Energy Efficiency Action Plan (NEEAP).

The Clean Technology Fund (CTF) has supported sustainable energy projects in Türkiye since 2012, with a total investment of US$5.6 billion, including US$464.5 million CTF co-financing and US$4.1 billion Multi Development Banks (MDB) co-financing (WB:US$3 billion, IFC: US$169 million and EBRD: US$980 million). These projects are estimated to save 902,000 tCO2e and US$568 million in avoided oil imports annually. The CTF has collaborated with MDBs like the World Bank, International Finance Corporation (IFC), and European Bank for Reconstruction and Development (EBRD). This collaboration has funded pioneering projects in Türkiye, leveraging private sector capital and the CTF has been instrumental in advancing Türkiye's transition to a sustainable energy future, as part of its broader digital and green transformation efforts.

The objective of Türkiye’s Clean Technology Fund (CTF) Renewable Energy Integration (REI) new Program Investment Plan (IP) is to support Türkiye’s ambitious plan to scale-up renewable energy by 2035 including by enabling flexibility of energy systems for smooth integration of higher shares of variable renewable energy generation in Türkiye's grid. This objective aligns with the REI Program Impact objective excluding focus on increasing off-grid access to renewable energy, since the latter aspect is not relevant for Türkiye. The IP will also support the government in its efforts to tackle the barriers with regard to the REI, including economic, financial, operational, social and regulatory barriers, elaborated in the document.

CTF-REI concessional resources will catalyse MDBs financing (namely The World Bank, EBRD and IFC as per the government’s request), private investment and other co-financing in technologies/projects required to meet the country’s NDC and decarbonization commitments. The types of technologies, infrastructure, innovative models, and enhancement activities prioritized by the program which will be eligible for receiving funding correspond to those described in the Supported Activities section.

CTF-REI resources will be implemented through two components as follows: 1) Component 1 (Beneficiary: TEİAŞ) Transforming Power Transmission System for REI, and 2) Component 2 (Beneficiary: private sector): System Flexibility, Balancing, Stabilization and Strengthening Power Infrastructure, that covers e-mobility infrastructure, battery storage, and digitalization of the power distribution grid. In case of availability of additional CTF grant financing of $3 million. the Government of Türkiye would like to use it for Component 3 on technical assistance projects, including the first pumped hydro storage and hydropower energy efficiency technical assistance. The requested envelope for Türkiye´s CTF-REI amounts to US$70 m., of which US$68 m. correspond to the CTF-REI financing, and grant financing of US$2 m.

Monitoring and evaluation of the Investment Plan will be conducted using an Integrated Results Framework (IRF), as described in this IP. The IRF, based on the REI Monitoring and Reporting (M&R) System toolkit, includes a set of results indicators across the following levels: CIF impacts; REI program impacts; program outcomes (including co-benefits); and program outputs. The Investment Plan’s three components relate to each level of results with a view to achieving program-level impacts as detailed below, responding to the whole energy system analysis as described below.

#

# II. Country Context

## Economic Social, and Political Context

**As described in the recent Country Partnership Framework Document (CPF)[[1]](#footnote-2), Türkiye’s development achievements over the past two decades have been remarkable.** Real gross domestic product (GDP) growth averaged 5.4 percent between 2002 and 2022 resulting in income per capita (in real terms) more than doubling over the same period. Moreover, growth was accompanied by rapid poverty reduction with the poverty rate (US$6.85 2017 purchasing power parity–(PPP)) decreasing by more than half, from above 20 percent in 2007 to 7.6 percent in 2021. On the sustainability front, the country has managed, through expansion of services, to relatively decouple growth from greenhouse gas (GHG) emissions and maintain per capita emissions below the Organization for Economic Co-Operation and Development (OECD) and European Union (EU) averages.

**Yet, to ensure that these positive trends continue and are sustained over time, Türkiye will need to address several emerging challenges on the growth, poverty and inclusion, and sustainability fronts**. First, the combination of a difficult macro-economic situation in the aftermath of the Coronavirus Disease 2019 (COVID-19) pandemic, the composition of investment,[[2]](#footnote-3) and declining factor productivity since the mid-2010s raise questions about future medium-term growth prospects. Second, the speed of poverty reduction has slowed since 2016, as increases in inequality have offset the poverty gains from continued strong growth. Third, Türkiye suffers from an emissions intensive industrial base, continued reliance on fossil fuels, carbon-intensive transport, and inefficient buildings. The country’s carbon intensive manufacturing sector exposes it to both risks and opportunities when the EU (which represents 41 percent of Turkish exports) starts implementing the Carbon Border Adjustment Mechanism (CBAM) in 2026. Fourth, its geographic, climatic, and socio-economic conditions leave Türkiye particularly vulnerable to the impacts of climate change, making adaptation a high priority.

**Following the May 2023 elections, the Government has taken steps towards normalizing the economy in a gradual way in order to manage risks associated with the adjustment process.** This includes monetary policy tightening, with interest rates increasing from 8.5 percent in May to 50 percent in March 2024, the unwinding of distortive financial regulations, and fiscal revenue measures to curtail the fiscal deficit. Markets are reacting positively with 5-year CDSs declining from around 700 basis points (bps) in May 2023 to below 300bps in May 2024, major rating agencies upgrading their outlook to positive recently, and two of them (Fitch & S&P) upgrading the credit rating (to B+) on March 8, 2024, and May 3, 2024, respectively.The authorities are also contemplating how to complement these actions with structural reforms that may help with growth prospects going forward. These efforts will need to be sustained and supported in the coming months because the monetary, fiscal, and macro-prudential challenges and associated economic vulnerabilities were of such magnitude that despite the significant progress, there is some road ahead.

**In parallel, Türkiye continues to address the effects of the earthquakes that hit the country on February 6, 2023.** With magnitudes of 7.8 and 7.5, the earthquakes were followed by thousands of aftershocks and another 6.7 magnitude earthquake on February 20. According to official statistics, they caused more than 50,000 casualties, injured 107,000 people, damaged or destroyed 1.9 million housing units, and displaced 3.3 million people, of whom 2 million needed shelters. An assessment[[3]](#footnote-4) conducted by the Government of Türkiye with support from the EU, the United Nations (UN), and the World Bank (WB) estimated recovery and reconstruction needs associated with the earthquakes at around US$81.5 billion. Risks also remain high: according to the UN, Türkiye ranks 9th globally with regards to human losses due to earthquakes, with about 70 percent of its population living in first- and second-degree seismic zones.

**The country’s strategic geographic location as a door to the Black Sea and a bridge between Europe and Asia has elevated the profile of Türkiye in recent regional conflicts**. Türkiye, because of its geographical and diplomatic position as well as its own socio-economic interests, has turned into a key interlocutor between Russia and Ukraine, helping secure global shipments of food through Turkish straits. Also, the Syrian civil war led to an inflow of Syrians under Temporary Protection (SuTPs) into Türkiye (3.2 million in 2024) and to an agreement with the EU to support SuTPs and their host communities as well as preventing irregular migration into the EU. Indeed, Türkiye’s efforts to support the SuTP have been significant, and the country is also a key stakeholder for the Middle Corridor which represents an important Asia-Europe route for improved transport and trade connectivity.

**The development of its private sector is key for Türkiye’s transition to high-income status.** The private sector constitutes 98 percent of the country’s top 500 firms in terms of turnover and as it accounts for 78 percent of investment, state-owned enterprises (SOE) take up a smaller share of the economy compared to other countries.[[4]](#footnote-5) It is also the major employer in the country, as about 85 percent of employees work in private companies,[[5]](#footnote-6) with Small and Medium Enterprises (SMEs) employing 72 percent of the overall workforce. At the same time, SMEs generate more than 50 percent of gross value added.[[6]](#footnote-7) In this context, Türkiye’s ability to build a productive, sustainably growing economy depends on the capacity of SMEs to expand, adopt the latest technologies, innovate, and participate in global value chains.

**COVID-19 is still present on the policy agenda.** Türkiye successfully mobilized to respond to the health and socio-economic effects of the pandemic, and quickly intensified infrastructure investments for COVID-19 screening and treatment. Indeed, it was among the first countries to launch its vaccination program, administering at its peak more than 1.5 million doses per day[[7]](#footnote-8). The government’s policy response also helped cushion the blow for businesses and households, and Türkiye was among the few emerging-market economies that did not experience negative economic growth in 2020. Türkiye is working to build on the recent experience with enhanced pandemic preparedness in both monitoring and response.

**Türkiye’s geographic, climatic, and socioeconomic conditions make it highly vulnerable to the impacts of earthquakes, climate change, and other environmental hazards, making adaptation and resilience high priorities**. It has a ‘high vulnerability’ in 9 out of 10 climate vulnerability dimensions, compared with a median of 2 out of 10 in other OECD countries. Climate-related disasters have been striking with greater frequency and intensity over the last two decades. In 2019 alone, 935 extreme events occurred, caused mainly by heavy rains and floods, windstorms, snow, and hail. Climate models predict this trend to continue with increasing abnormalities in precipitation patterns with more frequent extreme rain and floodings, as well as protracted drought and wildfires, and sea-level rise. The earthquakes in February 2023 were a tragic reminder of Türkiye’s high exposure and vulnerability to seismic hazards. Over 70 percent of the country’s population and 80 percent of its GDP are in seismic risk zones, including its largest metropolis and major economic hub Istanbul according to the latest CPF. Climate change is expected to aggravate the pressure exerted by extreme events posing multidimensional risks to welfare and livelihood security. Türkiye has started to lay a solid foundation for building resilience and addressing depletion of natural resources through planning and policy development, including institutional arrangements at various levels of government and in various sectors. In addition, incentives for earthquake resilient reconstruction of existing non-resilient building stock and long-term, affordable local currency financing to enable residential reconstruction are much needed.

**In particular, climate change is having a significant effect on Türkiye and impacting policy making.** Türkiye has experienced a growing exposure to climate-related disaster risks. A serious drought occurred in the central and eastern regions of the country during the 2020/2021 agricultural season, whereas flooding in the Black Sea region in 2021 caused the loss of many lives, and significantly damaged or destroyed public and private infrastructure. Also in 2021, forest fires in the Mediterranean Region, considered amongst the worst in the country, burnt around 1,700 square kilometers of forest. The outbreak of sea mucilage in the Marmara Sea affected sea life, damaged the fishing industry, and threatened to impede the only shipping access to the Black Sea. Although carbon intensity and energy efficiency have improved in recent years, total emissions have increased, and Türkiye ranks 15th among countries in annual GHG emissions, up from 18th in 2019. The country is responding to these challenges with adaptation and mitigation interventions, such as the Water Efficiency Campaign initiated in January 2023.

**However, Türkiye’s rapid economic growth alongside a rising population has also led to unsustainable increases in resource use, waste generation and greenhouse gas emissions.** Total domestic extraction of natural resources more than tripled over the past two decades, while Türkiye’s net Greenhouse Gases (GHG) emissions have increased from 164 MtCO2e in 1990 to 467 MtCO2e in 2020, the fastest pace in the OECD over the last decade. This increase in GHG emissions reflects continued GDP and population growth and was observed across all sectors of the economy, but particularly in energy,[[8]](#footnote-9) with emissions growing 3.8-fold between 1990 and 2020 as Türkiye is still heavily reliant on fossil fuels for its energy supply.[[9]](#footnote-10) Türkiye is also highly vulnerable to the impacts of climate change and other environmental hazards due to a combination of geographic, climatic, and socioeconomic conditions; Türkiye has high vulnerability on 9 out of 10 climate vulnerability dimensions, compared with a median of 2 out of 10 in other Organization of Economic Co-operation and Development (OECD) countries.

**As a large producer of emission intensive products, Türkiye faces risks from the global transition to a low carbon future.** Türkiye is the 5th largest producer globally of cement and the 8th largest producer of steel. As countries take action to decarbonize their economies, demand will drop for fossil fuels and emissions intensive goods. The EU Carbon Border Adjustment Mechanism (CBAM) is a tangible example, where the EU will place a fee on the import of certain emissions intensive products to create a level playing field for domestic producers subject to the EU emissions trading system. The CBAM will only apply to a select group of the most emissions intensive and trade exposed sectors, beginning in 2026, although it is likely to expand to other sectors over time. With the EU as Türkiye’s largest trading partner, absorbing 49 percent of Türkiye’s total goods exports, these trends emphasize the need for the corporate sector to transition towards green to preserve growth potential. This transition requires long-term finance to scale up private capital and minimize costs, but macro-financial volatility, specifically currency volatility and persistently high inflation, undermine the development of domestic sources of long-term finance in Türkiye.

To respond to these challenges, in July 2021, the government released its Green Deal Action Plan[[10]](#footnote-11) to help transition towards a sustainable and resource efficient economy and prepare for the comprehensive changes envisaged by the European Green Deal. In October and November 2021, Türkiye ratified the Paris Agreement, committing to net zero emissions by 2053, and advancing plans for resilient decarbonization, it also created a new Directorate of Climate Change in charge of coordinating the climate transition across all Governments, and signed a Memorandum of Understanding (MoU) for increased climate action with six key development partners of which the World Bank and IFC are two. As per the Climate MoU, the Bank is following through on its pledge to mobilize an additional IBRD US$2bn across FY23-24 for climate financing with a robust set of climate-focused projects being prepared for FY23 and FY24. Local and global events have also led to increasing awareness of climate change impacts and the need for reduced emissions. In December 2022, the government issued the National Energy Plan (2023-2035) with targets to massively scale-up renewables and flexibility resources by 2035. Issued in November 2023, the 12th National Development Plan (2024-2028) lays out a comprehensive agenda to transform Türkiye’s economy in line with climate goals, with a focus on immediate actions until 2028. More recently, in January 2024, the Minister of Energy has announced the new National Energy Efficiency Action Plan (NEEAP).

## Sectoral and Institutional Context

**As mentioned above, Türkiye aspires to achieve carbon neutrality by 2053, but reaching such a goal requires major changes in its energy system.** Türkiye’s ratification of the Paris Agreement in October 2021 and its pledge to achieve net zero emissions by 2053, were strong signals of the country’s commitment to join the global community in tackling the climate global emergency. As part of the Paris Agreement process, Türkiye submitted the first iteration of its Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) in November 2022, outlining its climate actions and targets. The Government of Türkiye (GoT) is also currently working on its Long-Term Decarbonization Strategy, which will further define measures and actions to address climate change.

**As indicated in the World Bank’s Türkiye Country Climate and Development Report (CCDR, 2022), Türkiye can also improve energy security through an accelerated pace of least-cost investments in domestic solar and wind**—building on its track record of tripling renewable energy capacity in the last decade and investing in energy efficiency, battery, and pumped storage, geothermal, and gas generation with carbon capture and storage. This would require substantial commercial financing to enable the country to meet a doubling of energy demand by 2053 needed to fuel its growth ambitions, with the added benefits of lowering emissions and improving energy security.

**Increasing energy demand (expected over 3 percent per year for the next 10 years), driven by Türkiye’s growing economy, constitutes another macroeconomic challenge and an energy security risk**. The primary energy consumption in Türkiye has more than doubled over the past two decades to fuel economic growth and is projected to increase by 50 percent over the next two decades. A large portion of its energy demand (up to 75 percent) depends on imports (99 percent of gas and 93 percent of oils are being imported), and its energy imports accounted for almost 20 percent of Türkiye’s total imports in 2021, contributing to massive current account deficits (nearly US$51 billion in 2021). The country’s high energy and carbon intensity, 145 ton of oil equivalent ktoe/US$ 2015 and 440 grams of carbon dioxide equivalent per kilowatt hour (gCO2e/kWh), respectively (well above the EU averages which are 88 ktoe/US$ 2015 and 229 g CO2e/kWh, respectively), make it vulnerable to global energy prices. However, in response to increasing consumer energy price inflation (for 2022 around 137 percent), Türkiye has accelerated energy efficiency investments which made it second among OECD countries in terms of improvement of energy intensity in 2021.

Scaling up renewable energy (RE) is a core government development policy, critical to strengthen energy security and achieve the country’s 2053 net zero emission target. Türkiye is endowed with considerable RE resources, including solar, wind, and geothermal. Utilizing these RE resources and achieving energy security has long been at the core of the government strategy. As of end-2023, the total installed capacity reached 107 gigawatts (GW) where 47% is thermal, 30% is hydro and 23 % is other renewable resources namely wind, solar and geothermal. The electricity generated in 2023 is 326,302 GWh out of which 39% is from hydro and other renewable energy resources[[11]](#footnote-12), as shown in Figure 1 below.

**Figure 1:** Energy Generation Mix (kWh and %, 2023)

 Source: TEİAŞ, December 31, 2023

**Efforts to establish carbon markets have been accelerated with the joint and structured actions by the state energy institutions in order to comply with the EU’s CBAM**. The European Energy Exchange (EEX) and the Turkish Energy Exchange (EPİAS) signed a Memorandum of Understanding (MoU) to underline their joint commitment in developing the Emissions Trading System (ETS) in Türkiye, while the Energy Market Regulatory Authority (EMRA) publicized a draft communique with regard to the carbon markets.

## Government’s Energy Strategies and Targets

**Government’s energy strategies and targets have mainly been outlined in the four reference documents**, i.e. 12th NDP (2024-2028), Medium-Term Program (2024-2026), Türkiye NEP and NEEAP (2024-2028), aiming to ensure energy supply that is sustainable and affordable energy; diversify resources of energy supply; exploit indigenous and renewable energy target, use nuclear energy in electricity generation; increase energy efficiency; prioritize localization of energy technologies and integrate new technologies; gain a competitive structure in order to enhance the country’s strategic position in the international energy trade. MENR will soon announce the new Strategic Plan covering the period from 2024-2028.

**Government is planning to meet high energy demand in the medium term mainly from renewables and nuclear**, nevertheless additional investments will be made for natural gas and indigenous coal power plants. Electricity consumption will reach 510.5 terawatt hours (TWh) in 2035 from 330.3 TWh in 2023 with a compound annual growth rate (CAGR) of 3.7%. Wind installed capacity is expected to reach 29.6 GW (24.6 GW onshore and 5.0 GW offshore) whereas solar installed capacity is expected to reach 52.9 GW. Nuclear installed capacity is expected to reach about 7.2 GW while geothermal and biomass capacity will reach 5.1 GW. 10.0 GW of additional natural gas capacity and 1.7 GW of local coal capacity is forecasted to be added to the generation capacity.

**In terms of RE scale-up, Türkiye has designed one of the most ambitious strategies globally to scale up renewable energy generation**. The strategy plans to add up to 60 GW by 2035 (5 GW per year) and is part of the country’s effort to meet its energy security objectives and commitments to achieve net zero emissions by 2053. The Minister of Energy and Natural Resources has recently presented this ambitious strategy in Dubai in a World Bank organized event at COP28.

**The ambition to scale up RE generation necessitates a qualified and diverse human capital.** Türkiye’s 12th Development Plan for 2024-2028 sets out a clear vision and enabling environment to equip the prospective workforce in line with the labor market requirements of the green and digital transformation promoting a sustainable collaboration between the public and private sector and national education institutions to design market-oriented technical and vocational training and educations systems targeting greening and digitalizing sectors including renewable energy.

**Flexibility requirements needed to balance the intermittent renewable capacity needs to be initiated now to enable the planned ambitious scale up of RE.** In the World Bank CCDR, the required investment in the transmission and distribution systems are estimated at US$8 billion between 2022-2030 and US$14 billion 2030-2040. The Minister has also recognized the need to ensure integration of Renewable through: (i) expanding, modernizing and digitizing the transmission networks, as well as international electricity interconnections; (ii) developing storage capacity including pumped storage hydroelectric power plants (HEPPs), (iii) enhancing system balancing by improving efficiency of Türkiye’s hydropower park, (iv) more flexible electricity networks, smart meters, Supervisory Control and Data Acquisition (SCADA) systems, and demand-side participation; as well as (v) increasing grid resilience.

**The 12th NDP (2024-2028)[[12]](#footnote-13) also envisages investments in energy efficiency, green hydrogen, and energy storage**, that will play a critical role in achieving net zero emissions by 2053. In this direction, tenders for new Renewable Energy Resource Areas (YEKA) with domestic component obligations will be held, and studies will be carried out for the development of offshore YEKA projects. Transactions such as permits, licenses and warrants related to investments will be streamlined by transferring them to the online platform in the Medium-Term Program (2024 – 2026).

**Figure 2**: Installed Capacity Targets in NEP by 2035 (G

Source: NEP

**Policy and regulatory framework will also need to be strengthened further with action plans so as to reach the climate targets,** including the update of the Second Nationally Determined Contribution, and preparation of a Climate Change Strategy for the energy sector in line with the 12th NDP, as well as the 2024-2029 TEİAŞ Strategic Plan.

**Accelerating energy efficiency is another critical pillar of the government’s energy policies aiming to diminish 16% of the primary energy consumption** and 100 million tons of CO2 emission. 2nd National Energy Efficiency Action Plan valid for 2024-2030 is comprehensively structured around 7 thematic subjects which are industry and technology, building and services, energy, transport, agriculture, common topics, start-ups and digitalization. It aims to provide 37.1 million tons equivalent of petroleum (MTEP) energy savings with a 20.2 US$ investment between 2024-2030.

**Wide range of measures are targeted so as to increase energy efficiency from generation and networks to general lighting and tariffs**.[[13]](#footnote-14) External financing opportunities will be sought for investments needed to eliminate efficiency losses due to equipment and operation in reservoir hydroelectric power plants and to increase energy efficiency in electricity transmission and distribution networks.

## Government’s Climate Strategies and Plans

**In October 2021, Türkiye ratified the Paris Agreement, adopted a net zero emissions target by 2053**, created a new Climate Presidency in charge of coordinating the climate transition across all Governments, and signed a MoU for increased climate action with six key development partners of which the World Bank, European Bank for Reconstruction and Development (EBRD) and International Finance Corporation (IFC) are three. Türkiye, because of its geographical location, is one of the most negatively affected countries from climate change. While average temperature is increasing causing draught, floods occur with sudden torrential rains. As per the Climate MoU, the World Bank is following through on its pledge to mobilize an additional US$2 bn for climate financing with a robust set of climate-focused projects being prepared for FY23 and FY24. The World Bank’s Energy Program has significantly contributed to this MOU.

**Energy sector remains as main contributor of the GHG emissions**. According to the results of the greenhouse gas inventory, total greenhouse gas emissions in 2021 increased by 7.7% compared to the previous year, reaching 564.4 million tons (Mt) of CO2 equivalent(eq.). Total greenhouse gas emissions per capita were 4 tons of CO2 eq. and 6.7 tons of CO2 eq. in 1990 and 2021, respectively. In 2021, 85.2% of total CO2 emissions stemmed from the energy sector (of which 32.7% comes from electricity and heat generation), 14.5% from industrial processes and product use, and 0.3% from agriculture and waste[[14]](#footnote-15).

The Government updated the Türkiye’s Nationally Determined Contribution (NDC) declaration in April 2023 and submitted to the United Nations Climate Change Framework Agreement Secretariat as 41 percent, equivalent to aa 500-million-ton reduction in emissions. Emissions are expected to peak in 2038 and start declining in absolute terms from that year.

**The Green Deal Action Plan issued in July 2021 with a Presidential Circular[[15]](#footnote-16), aims to adopt comprehensive measures**. envisaged by the European Green Deal. The Action Plan prioritizes nine main areas as follows: (1) carbon border adjustments, (2) a green and circular economy, (3) green finance, (4) a clean, economical, and secure energy supply, (5) sustainable agriculture, (6) sustainable smart transport, (7) combating climate change, (8) diplomacy, and (9) European Green Deal information and awareness-raising activities. , The Green Deal Working Group, chaired by the Deputy Minister of the Ministry of Commerce, was established to monitor the implementation of the Action Plan with the participation of the Presidency Directorate of Strategy and Budget, as well as several ministries and if need be, with support from the universities, non-governmental organizations, professional associations, and private sector.

**The Green Deal Working Group’s 2022 Activity Report revealed improvements in the country’s primary energy intensity** (2.7% improvement in 2021 compared to the previous year), increase of installed capacity increase by 55% in 2022, and 90 million tons of greenhouse gas emissions avoided annually as a result of precautions taken in energy efficiency and renewable energy [[16]](#footnote-17).

**Efforts are underway to implement the Emission Trading System in order to control emissions and maintain a healthy trade with the European Union.** For this purpose, a Partnership of Market Readiness (PMR) project with the World Bank on Carbon Markets was carried out and this technical assistance project, which lasted for approximately 7 years, was completed and it was concluded that the most accurate market-based mechanism is the Emission Trading System (ETS). Following this study, the "Carbon Market Implementation Partnership-PMI" project was commissioned with the World Bank in April 2022. As a result of all opinions and evaluations, a recommendation was made for the establishment of ETS in Türkiye and its implementation as a pilot in 2024. EPIAS has announced that, EEX, an energy exchange that has been organizing emission allocation tenders since 2010, and EPIAS, Türkiye's energy exchange, will develop a partnership for the development of the ETS system, which will ensure the establishment of a carbon market in Türkiye and that the practices are compatible with the EU. A memorandum of understanding on the subject was signed by the parties on February 28, 2024. Moreover, Energy Market Regulatory Authority (EMRA) publicized a draft communique so as to operate carbon markets.

## Gap/Barrier Analysis and Needs Assessment

##

#### Political, Social and Economic Barriers

**Main concern of the government is the end-user consumer price of the electricity.** Concern emerges due to social-political and economic contexts of the electricity which have a considerable impact on electoral voting behavior.

**At the social-political context, households and SMEs are extremely sensitive to the electricity prices and they protest high prices, thus these are subsidized by the government.** Since there have been many elections and referendums in recent years, the Ministry of Energy and National Resources (MENR), Electricity Generation Corporation (EUAS) and EMRA put joint effort to subsidize end-user electricity prices. EMRA legislated gradual tariffs for households and commercial customers depending on the daily consumption. These tariffs have been highly subsidized by EUAS, and they have been far from being cost reflective. According to the statements of government officials, 50% of household electricity and 75% of the natural gas consumption of households are subsidized.

**Subsidies via end-user tariffs lead to a deterioration in the working capital of the investors whereas create a burden on the government budget.** The deterioration in working capital affected all the energy value chain from distribution to retail sales and from electricity generation to natural gas since companies faced tariff deficits. State owned companies such as EUAS and Petroleum Pipeline Company (BOTAS) sell electricity and natural gas below the cost, and they usually default on their tax to the government, causing a burden on the budget.

**On the economic context, government has aimed to control electricity and natural gas prices since they have an overall impact on the producer and consumer price.** However, cumulative impacts of the price controls grow substantially and become financially unmanageable within the government budget limits.

**All these interrelated political, social, and economic concerns deteriorate a well-functioning energy value chain.** Both local and foreign investors have lost investment appetite except for the ones with the offtake guarantees. Deterioration in the right price signal has decreased investments in energy efficiency, renewable energy, and reserve capacity investments.

**Urgent action is needed to implement cost-based prices for all customer groups in order to encourage investments and lower the financial burden on the treasury.** The Ministry of Family and Social Services launched an initiative in 2019 providing monthly electricity consumption support to citizens receiving social assistance, based on the number of household members. A more comprehensive implementation of this program would eliminate the above-mentioned challenges.

#### Financial Barriers

**Long-term commercial financing is not sufficient in the Turkish markets and there is a maturity mismatch between the loan repayments and investment payback periods.** Therefore, companies should provide bridge credits. The average term for bridge credits is less than two years which creates uncertainty for the investors since they need to roll over the financing in a highly volatile and unpredictable macro-economic environment.

**Due to the monetary tightening policy of the Central Bank of Republic of Türkiye (CBRT), companies are having considerable difficulties to provide Turkish Lira denominated credits.** Borrowing rates increased considerably after the May 2023 Presidency and Parliamentary elections. CBRT policy rate reached 50% in 2024 March compared to 8.5% in May 2023. Therefore, some of them have focused on the bond market although bond volumes are far less than their financial needs.

Foreign Exchange **(FX) financing conditions are not supportive and borrowing rates are still high compared to the last 10-year historical average.** Companies avoid FX financing due to the volatility in the markets and high hedging costs despite a considerable decrease in the country’s risk premium.

**These conditions are even more challenging for real people and small companies who aim to invest in renewables compared to big corporates.** Moreover, some of the big corporates opt to invest in foreign markets such as the USA due to predictability and supportive mechanisms such as the Inflation Reduction Act (IRA) due to the crowding-out effects in Türkiye.

**Lack of long-term power purchasing agreements (PPAs) is another major issue that prevents long-term financing for renewable energy sources (RES) investments.** Volatile macro-economic environment forces market players to make transactions at organized markets such as day ahead and intraday markets instead of engaging in long-term PPA contracts. To overcome this issue, transmission and distribution companies would procure their energy need for losses and general lighting from long-term RES PPAs. Moreover, EUAS would procure some of the energy it sells to the market from RES PPAs to encourage a long-term over the counter (OTC) PPA market.

**Although the electricity distribution companies have started to invest in digitalization and smart grid for electricity distribution systems for the last decade, the regulatory body does not approve some of the new technologies under the regulated asset base.** Therefore, the companies require financial support to expedite digitalization, implement smart grid systems for the electricity distribution system and upskill their workers with necessary digital skills.

**Moreover, a massive amount of grid investment is needed to comply with increasing demand and growing RES capacity.** Every year 1.4 million new consumers are connected to the power grids (both at transmission and distribution) that have aged and should be replaced. An even greater amount of investment is needed to invest in new capacities needed to integrate renewables, heat pumps and electric charging stations. However, utilities lack the financial capacity and favorable market borrowing conditions to finance these much-needed investments.

#### Operational Barriers

**Lack of sufficient transmission capacity to integrate RES is a major challenge for 2035 targets which Türkiye National Energy Plan (NEP) envisages.** MENR aims to increase the RES capacity by 5 GW annually. However, Turkish Electricity Transmission Company’s (TEİAŞ) long term strategies and plans are ambiguous. Clarity and predictability for investors is needed in terms of the connection capacity, volumes and locations.

**Allocation of transmission capacities with regard to investor groups creates further uncertainty for investors.** Allocation of capacities for self-consumption, hybrid storage with wind and solar and conventional RES investments are not shared with the public in advance which creates unpredictability for merchant investors.

**One-stop application combining all rules and procedures under one body would simplify and shorten permitting processes and encourage RES investors.** Complex and lengthy approval and permit process is one of the main operational barriers for investors. Depending on the RE source, investors need to apply to various authorities and institutions to receive necessary approvals and permits. The long lead time due to several separate bodies involved in the permitting process and lack of coordination between stakeholders complicates RE investments. One-stop application combining all rules and procedures under one body would simplify and shorten permitting processes and encourage RES investors.

**Instant load management is a significant concern as a greater unlicensed RES capacity is connected to the transmission and distribution grid.** Monitoring, controlling, and balancing the supply of these facilities is critical to manage overall energy system. However, sufficient investment for smart grid and digitalization is absent.

#### Regulatory Barriers

**Transparency is one of the major concerns of market actors with regards to policy and regulation preparation processes.** Some private sector investors state that draft legislation is not shared with the stakeholders, or their opinions are not included in the legislative processes. The regulations should be transparent and there should be no information asymmetry.

**Frequent changes in regulations create uncertainty and complications for the market players and distorts well-functioning investment environment.** For example, the unlicensed generation regulation has undergone several amendments since its first implementation in 2019. While making changes to the regulation based on needs is normal, a consistent regulatory framework provides a more stable investment environment.

**Avoidance of retroactive legislative changes is a significant problem for some investors.** For example, some investors complain about excess energy sales via Turkish Renewable Energy Resources Support (YEKDEM) mechanism were limited by a certain factor of the consumption with an EMRA decision retroactively although there was no legal limitation at the investment decision or financing phase. Such cases would distort cash flows assumed for the project feasibility.

**Low realization of projects from license to operation phase perceived by some investors as another regulatory barrier.** According to public authorities, approximately 28,000 Megawatt (MW) of licensed project have not been realized and allocates worthy transmission capacity idle. Regulations should be developed to decrease idle capacities.

**Some of the merchant investors complain about the unfair conditions favorable to the unlicensed RES investors.** Unlicensed investors have recently had priority for transmission capacities, and they are exempt from balancing requirements on the contrary to merchant investors.

**Some of the investors also complain that some investment processes are not inclusive such as storage with wind and solar due to the information asymmetry and “come first served” approach without any bidding processes.** As a result, some qualified investors could not acquire sufficient capacities while some investors act as intermediary and trade their allocated licenses at the second-hand market with higher prices.

# III. Renewable Energy Integration Context

## Renewable energy framework

**The 2005 Renewable Energy Law (REL) No. 5346 defines the renewable energy sources as non-fossil energy sources such as hydraulic, wind, solar, geothermal, biomass, wave, current and tide.** However, the reservoir area of dam-type Hydroelectric Power Plants (HPPs) exceeding 15 km2 are not eligible to benefit from Feed-in-Tariff (FIT) Mechanism. Please see detailed information on the renewable energy legislation and the authorities in charge of executing the relevant legislation in Annex 2.

**Following the enactment of 2001 Electricity Market Law (EML) for the liberalization of the market and 2005 REL, the renewable energy investments scaled up.** Earlier, the only way of constructing a renewable power plant to generate electricity for a private investor was either to install an auto producer facility or to realize a Built-Operate-Transfer (BOT) project. Hence, as shown in, the projects utilizing renewable energy had 11,221.6 MW installed capacity in the year 2000 and renewable share in the total capacity was 41.2%. Under the BOT model, 3 Wind Power Plants (WPP) having a total installed capacity of 18.9 MW and 13 HPP having a total installed capacity of 846,91 MW were constructed and operated then. In the early years of reform, neither the administration nor the investors were ready to invest in renewable resources for electricity generation since the technical prerequisites were not determined, a support system was not developed and the study of the determination of connection capacity limits of grid was not finalized at that time. As the legislation developed, the installed capacity developed and constructed by the private sector’s contribution increased considerably and reached 15,487.1 MW in 2009, but its share in the total capacity decreased to 34.6% due to the constructed thermal plants. With the development of unlicensed generation legislation, the construction of renewable facilities boomed. In 2015, total renewable capacity reached 31,520.8 MW, comprising 43.1% of total capacity. By end-2023, renewable capacity reached 58,819.3 MW, with a 55.2% share in total capacity. This achievement has significantly exceeded the original target of 38.8 percent of RE in the power generation mix by 2023 set in the National Renewable Energy Action Plan (2013–2023), placing Türkiye as the fifth largest RE generator in Europe and the 12th largest in the world. Please see Annex 3 for Türkiye power sector overview.

Figure 3: The development of renewable capacity and the total capacity (2000 – 2023)



Source: TEİAŞ

**Share of renewables in the generation mix increased from 24.9% in 2000 to 32 percent in 2015 and** 42 percent in 2022, as shown in Figure 4.

Figure 4: Development of Renewable Generation in the Total Generation (2000-2023)

Source: TEİAŞ

**The REL was enacted to introduce certain incentives to the investors such as floor prices and priority of dispatch.** The regulatory framework for renewable energy was much strengthened in January 2011 with amendments to the REL, with the introduction of FITs in US$ ha for each type of renewable power generation. The amendment[[17]](#footnote-18) to REL about unlicensed RES generation gave the opportunity to unlicensed RES generators to benefit from the FIT as well. This was followed by the law on Renewable Energy Zones (YEKAs). The renewable energy resource areas are the areas having electricity generation potential through solar or wind sources. These areas are studied, and their realistic electricity generation capacities are determined. Eventually, an auction is being held, and a contract is executed with the company that offers the lowest electricity sales price, and the company in question is entitled to receive a provisional license.

With another amendment to REL[[18]](#footnote-19) in 2020, FIT was determined in Turkish Lira (TRY), and the amounts are left to be decided by the President, and the updating method of FIT was also left to be determined by the President. In line with this amendment, the tariff, tariff escalation principles and implementation duration applicable to electricity generators using renewable energy were determined[[19]](#footnote-20) and an updated tariff was issued recently[[20]](#footnote-21).

**Currently, there are four ways of installing renewable energy facilities to generate electricity as follows:**

* By using announced connection capacities applying to EMRA for receiving FIT. However, in case of connection capacity scarcity and/or project site overlapping with other applicants, the applicant can only gain the provisional license right, offering the lowest price in an auction process and receive the price determined in the auction.
* By participating in the YEKA tenders announced by the MENR,
* By developing an unlicensed project considering the connection capacities issued by distribution companies and TEİAŞ.
* through an undertaking to establish an electricity storage facility, to develop an electricity generation facility based on wind and/or solar energy up to the installed capacity of the electricity storage facility in question[[21]](#footnote-22).

**New capacities were announced for unlicensed RE investments, some capacities allocated have not been realized by the investors, thus creating idle capacities in the transmission grid.** TEİAŞ announced 3,750MW connection capacity in February 2024, following the MENR’s announcement of a 7,500MW capacity allocation for unlicensed renewable investments. However, some capacities allocated are not realized by the investors.

**Despite impressive growth in the RE market in recent years, Türkiye still uses only nearly 3 percent of its solar and 15 percent of its onshore wind potential.** The Government has made important progress in defining its strategy to achieve carbon neutrality, but this needs to be translated into more granular and concrete sector-level actions. As mentioned, the recently released NEP is a key milestone in setting energy sectoral targets by 2035, allowing the country to meet the carbon neutrality objectives by 2053. However, additional granularity is needed to inform implementation going forward. In this context, the Government and in particular the MENR, is working toward the release of the next Strategic Energy Plan, to cover the period 2024–2028, that will provide further details on sectoral targets and refine implementation modalities.

## Energy Storage

**Given the ambitious RE scale up plans of the Government, new legislation has been passed for the energy storage systems that will play a crucial role in system balancing peak shaving and grid stabilization.** The Regulation on Storage Activities[[22]](#footnote-23) enables Generation Licensees, Supply Licensees, TEİAŞ, Distribution Licensees and Consumers to establish storage facilities. According to the Regulation, Grid operator companies have some restrictions. Distribution companies can only install battery storage facilities if it is more economical than new network investment within the scope of investment plans. Provided that it is included in the investment plans, TEİAŞ may establish storage facilities within the scope of pilot applications and without being subject to commercial activities.

**Battery energy storage systems (BESS) are one of the energy storage options to improve RE availability and reliability.** Further regulatory changes are also required to develop innovative private-driven solutions for BESS. Following policy and legislative capacity-building support, EMRA published in May 2021 the Regulation on Storage Activities in the Electricity Market (and subsequent amended), which regulates the installation, connection, and general market activities for storage facilities and updated other regulations to incorporate storage. With an amendment to EML in 2022, which enables legal entities establishing a battery storage facility have the right of establishing WPP or SPP up to the installed capacity of the BESS. This article has boosted the battery storage license applications and EMRA suspended receiving battery storage applications.

In addition, the storage capacity should grow in proportion to the capacity of RES, which makes it hard to justify the investments economically. Thus, it is unlikely that these applications will result in actual installed capacity in the short term given that capital costs remain high and access to finance is limited for developers. This is in line with a World Bank analysis carried out in 2020–2022, which confirmed that very few BESS applications are commercially viable in Türkiye as of that date. The deployment of this critical technology requires further investment support to account for the incremental capital cost. Future enactment of targeted policy and regulations, including incentive systems, for storage would positively affect market confidence and allow early adopters to move ahead with investments in BESS. In particular, distributed BESS at commerce and industry (C&I), and later residential, customers could in the medium-term help provide decentralized storage and ancillary services.

With an amendment to Electricity Market Law (EML)[[23]](#footnote-24), legal entities that undertake to establish a battery storage facility gain the advantage of receiving a provisional license by EMRA for the establishment of an electricity generation facility based on wind and/or solar energy up to the installed capacity of the electricity storage facility they have committed to establish. This article has boomed the battery storage provisional license applications exceeding 120 GW[[24]](#footnote-25) in capacity and EMRA suspended receiving battery storage applications[[25]](#footnote-26).

**The recent introduction of storage license applications and the NEP targets has set the Turkish battery storage market on a path for substantial growth with more than 25 GW of battery storage licenses awarded, translating into more than US$ 20 billion in medium-term investments.** This regulatory progress is fostering an environment ripe for innovation and expansion. While private sector players are still in the early stages of understanding costs and revenue structures associated with building energy storage systems, their interest in developing trial battery storage projects with smaller capacities is a positive step towards larger investments. To further support these early-stage projects, concessional financing is essential. Concessional finance support will help overcome the high capital and operating costs and enhance the capacity to design and install these innovative and clean technologies, leading to improved RE availability and reliability, and paving the way for a more sustainable future.

With the increasing adoption of electric vehicles (EV), there is a growing need for infrastructure to support EV adoption in Türkiye. As of November 2023, the number of EVs amounts to 80,043, representing 0.53% of the total vehicle fleet in the country, meaning that there is significant growth potential. Furthermore, the increase of EVs on traffic was 5.5-fold in 2023 evidencing the need for accelerated investments in the EV infrastructure.

## Role of the private sector, innovation, and leverage of resources

**The country’s energy transition requires a more active role by the private sector, as most of the ambitious RE generation scale up program will be realized by the private sector in the medium to long term.** According to the 2022 NEP, by 2035, the installed capacity of solar and wind is targeted as 52.9 GW and 29.6 GW (24.6 GW onshore, 5 GW offshore), respectively, thus an additional 41.5 GW of solar, 12.8 GW onshore wind and 5 GW offshore wind facilities are planned to be constructed in the coming 11 years. The investment needs to realize this additional capacity would be nearly around US$100 billion over 11 years, including US$80 billion for generation, US$10 billion for transmission, and US$10 billion for distribution. Of the total investment needed, US$90 billion will have to come from the private sector. Moving toward the net zero emissions target by 2053 and building resilience in the sector will need around US$640 billion in net present value, this would require both the private sector and the public sector and MDBs to work together in order to mobilize this number of resources.

**In addition, an RE generation developer could need financing for the connecting lines, as it can finance or construct transmission lines connecting the generation facility to the transmission grid on behalf of TEİAŞ, if TEİAŞ does not have sufficient financing or cannot make timely investment planning[[26]](#footnote-27).** The ownership and operation responsibility of the facilities and lines built within this scope belongs to TEİAŞ and the generation licensee reimburses the cost of the investment from TEİAŞ.

**Another way of constructing transmission lines by a private RE developer is through constructing a private direct line**. A generation licensee may request to establish a private direct line between the generation facility and its customers, affiliates, or eligible consumers. The establishment of a private direct line is possible with a system control agreement to be made between the generation licensee and TEİAŞ or the distribution company. The private direct line must be installed outside the national transmission and distribution network and in accordance with the standards applicable to these networks. All kinds of facilities, equipment and immovable property required for the establishment and operation of the private direct line are acquired by the applicant.

Similarly, a generation licensee operating a generation facility located in the provinces on the border, with permission to be given by EMRA Board, can construct a private direct line without connecting it to the transmission or distribution system in accordance with the standards applicable to the national transmission or distribution system and export the electricity generated in the subject generation facility.

## Summary of MDB Engagement in the Türkiye Energy Sector

Please see Annex 7 for the detailed MDB engagement in the Türkiye energy/RE sector, as well as brief activities by the private sector, NGOs and bilateral institutions.

**The World Bank**

**The World Bank’s energy portfolio in Türkiye currently includes eight operations, amounting to over US$3.5 billion, which will be expanded with a healthy pipeline of new operations amounting to nearly again US$3 billion.** The World Bank’s Türkiye energy sector portfolio consists of four projects (including some with additional financing) that contribute to enabling renewable energy capacity (Renewable Energy Integration, Geothermal Development, Public and Municipal RE Project; Accelerating the Market Transition for Distributed Energy), four in energy efficiency (First and Second Energy Efficiency in Public Buildings Projects, Seismic Resilience and Energy Efficiency in Public Buildings and Türkiye Organized Industrial Zones) and one in the gas sector (Gas Storage Expansion Project - GSEP). In 2023, this portfolio enabled 956 MW of renewable energy and the portfolio is expected to enable 2,273 MW by 2028. Three technical assistance projects have also recently been approved: two under the IPA 2 (Phases 3 and 4) to support analytical work and de-risk offshore wind and one to support Partnership for Market Implementation (PMI) Program. ￼

**IFC**

In Türkiye, IFC has leveraged more than $3 billion to support private-sector efforts designed to increase energy generation, improve energy efficiency, and mitigate the impacts of climate change. IFC investments include 10 power generation projects with an installed capacity of 4,300 megawatts (MW), as well as power distribution projects that have achieved improving services for 3.9 million customers. Building on the World Bank reforms in the country, IFC has been a long-term investor, supporting the comprehensive reform of the sector. These efforts have successfully spurred innovation and created new markets, resulting in greater access to reliable electricity, accelerated economic growth, and an increase in labor force participation. IFC continues to finance power generation to meet Türkiye’s growing medium to long-term needs. Strengthening the distribution network is also a key priority for increasing renewable energy integration and resilience. In April 2024, the World Bank Country Partnership Framework FY24-FY28 was approved. IFC, together with IBRD and Multilateral Investment Guarantee Agency (MIGA), will continue to support projects aimed at increasing renewable energy production, as well as modernizing transmission and distribution networks. IFC remains keen to support the adoption of new clean technologies such as battery storage energy systems (both stand-alone and consolidated into renewable generation facilities), which will scale up the renewable generation and diversify the country’s generation mix as well as build up the resilience of power system.

### EBRD

In the past 10 years, the EBRD has invested EUR2 billion across 30 projects in Türkiye's energy sector (incl. renewables, energy efficiency, power distribution, etc). To date, the EBRD has invested EUR9 billion in supporting renewables, including large solar and wind projects. The EBRD has also invested in one of the largest geothermal power plants in the world, which alone increased Türkiye’s geothermal capacity by 30 percent. Those investments also contributed the strengthening of human capital in the sector by promoting the green and digital skills development of prospective workforce (i.e., design, maintenance, remote management of WPPs) via nationally accredited certifications granted by local education institutions. They also supported workforce diversity of the companies through the development and implementation of Equal Opportunity Action Plans.

The EBRD is also closely cooperating with national authorities to create an enabling environment for economy-wide decarbonization. For example, the EBRD has assisted the local government in developing the Renewable Energy Action Plan (in line with the EU’s Renewable Energy Directive) and in designing post-2020 renewable energy support schemes based on competitive tendering and the National Energy Efficiency Action Plan (NEEAP).

# IV. PROGRAM DESCRIPTION

The objective of Türkiye’s Clean Technology Fund (CTF) Renewable Energy Integration (REI) Program Investment Plan (IP) is to support Türkiye’s ambitious plan to scale-up renewable energy by 2035 including by enabling flexibility of energy systems for smooth integration of higher shares of variable renewable energy generation in Türkiye's grid. This objective aligns with the REI Program Impact objective excluding focus on increasing off-grid access to renewable energy, since the latter aspect is not relevant for Türkiye.

CTF-REI concessional resources will catalyze multilateral development banks (MDBs) financing, private investment and other co-financing in technologies/projects required to meet the country’s NDC and decarbonization commitments. The types of technologies, infrastructure, innovative models, and enhancement activities prioritized by the program which will be eligible for receiving funding correspond to those described below in the Supported Activities section.

CTF-REI resources will be implemented through two components as follows:

Component 1 (Beneficiary: TEİAŞ) Transforming Power Transmission System for REI

We consider US$ 38 million CTF lending, US$ 2 million CTF grant financing) to support the Transformation of the Power Transmission System Project - Phases 1-2 (2025, WB: nearly US$1.5 b., CTF: US$40m.).

Component 2 (Beneficiary: private sector): System Flexibility, Balancing, Stabilization and Strengthening Power Infrastructure (EBRD: US$150m., IFC US$150m., CTF: US$30m.)

* E-mobility infrastructure (EBRD and IFC)
* Battery Storage (EBRD and IFC)
* Digitalization of the power distribution grid (EBRD)

The CTF will support enabling clean energy transformation in Türkiye by scaling up low-carbon investments and technologies with significant potential for long-term greenhouse gas emissions savings. It will support a wide array of clean technologies across different areas, including REI, energy efficiency (hydropower) and clean transport. Moreover, the outcome of the components will amplify the results obtained by the previous CTF Program in Türkiye.

Please see Annex 4 for the CIF co-financed investments in Türkiye through CTF from 2012.

**Supported Activities**[[27]](#footnote-28)

The types of eligible infrastructure, technologies, and transformational activities prioritized by the program are described in the next sections. They will contribute to decarbonize Türkiye's economy by significantly contributing to the continuity and flexibility of the transmission infrastructure of the country. The strategic areas of intervention prioritized in the CTF-REI IP are:

**Component 1:** Transforming Power Transmission System Project - Phases 1 and 2 (2025 and 2027)

The first Phase of this component, namely Transforming Power Transmission System (TPTS) Project - Phase 1, will be part of a large REI program of US$ 1.5 billion, which was requested by the government from the World Bank, and aims to support Türkiye to transform the transmission system so as to support the country’s ambitious target of additional 60 GW of RE (specifically wind and solar) generation capacity by 2035, in line with the government’s pledge to achieve net zero emissions by 2053.

The Ministry of Treasury and Finance (MoTF) endorsed and shared with the World Bank on January 19, 2024 the formal request letter by the TEİAŞ for new World Bank and CTF loans.

The proposed Project Development Objective (PDO) is to assist Türkiye in scaling-up the renewable energy generation by strengthening and further digitizing the power transmission system and facilitating large-scale renewable energy integration. The project will consist of four sub-components as follows:

* Sub-component 1: Development of transmission infrastructure to facilitate scale-up of RE,
* Sub-component 2: Strengthening of transmission networks and interconnections,
* Sub-component 3: Digital and smart-grid investments to strengthen grid operation and management,
* Sub-component 4: Technical Assistance and Capacity Building. In addition, this component aims at preparing a second project (Phase 2).

The sub-components 1 and 2 are comprised of both greenfield and brownfield investments. Modernization and transformation of the power system will significantly contribute to ensuring future demand and improving the flexibility, adaptability, and resilience of the system to absorb higher volumes of VRE. Sub-component 3 comprises digital and smart-grid investments to strengthen grid operation and management such as upgrade of the nationwide SCADA-EMS.

The Government expressed interest in including in the scope of the proposed project a technical assistance component to help TEİAŞ improve its capacity for further integration of renewable energy and digitization of the power grid. A few potential ideas that the Government and TEİAŞ discussed with the World Bank, falling under the sub-component 4 of the project, are as follows:

* **Technical assistance for introduction of High Voltage Direct Current (HVDC)**: As the HVDC technology is unique and different from the traditional high voltage alternating current (HVAC) technologies, it is crucial to develop technical capabilities within TEİAŞ to select the right technology, undertake necessary system planning, perform economic analysis to bring out the full range of benefits of HVDC, and develop an understanding of operating the line at its optimal capacity. The project could cover various technical assistances including feasibility studies, market analysis, and capacity building.
* **Capacity Building and Training for SCADA/EMS:** As new functionalities are included in the latest SCADA/EMS, training for TEİAŞ dispatchers is critical to take full advantage of these functionalities to optimize system dispatch and manage system control. Also, implementations of SCADA/EMS upgrade and new full-fledged SCADA/EMS are extremely challenging. The Project can provide various capacity building activities for TEİAŞ including hiring of supervision consultants.
* **System Management for VRE Integration**: Given the ambitious government’s plan to develop variable renewable energy, TEİAŞ needs to develop its capability to manage such a large amount of VRE in the system. The Project can support various areas for VRE integration including some technical assessments, and capacity building.

**Project Preparation Timeline Regarding Component 1 – Phase 1:**

The major milestones and their respective timeline with regard to the project, as agreed with the Government are as follows:

* Concept review : September 2024
* Project appraisal : December 2024
* Negotiations : March 2025
* World Bank Board of Executive Directors’ approval : May 2025
* Effectiveness and start of implementation : September 2025

**Component 2: System Flexibility, Balancing and Stabilization and Strengthening Power Infrastructure** (EBRD: US$150m., IFC: US$150m., CTF: US$30m.)

This component will support the Government of Türkiye in enhancing the system flexibility, balancing and stabilization through energy storage operations, and will support the co-financing of investments with regard to e-mobility, specifically EV charging stations, and digitalization of the power distribution grid.

**A) Battery storage:**

Activities under the sub-component will support projects that advance the adoption of battery storage and demonstrate the viability and/or large-scale application of battery storage solutions.

EBRD and IFC are exploring several potential projects with battery storage components that are at the early stages. Given the allocation of pre-licenses under solar/wind power projects with battery storage components, several local and international developers are seeking financial support at an early stage. EBRD and IFC expect to receive increased interest for financing requests in this area starting from 2025.

IFC has a close collaboration with private sector players who are actively developing such projects. Based on preliminary discussions with a selected number of companies, IFC is looking to deploy potentially US$100-150 million financing (subject to the bankability and credit due diligence), expected to be implemented in 2025-2026.

Given the Government’s ambitious RE scale-up plans, energy storage systems will play a crucial role in system balancing, peak shaving, and grid stabilization. The need for concessional finance is immense, as it will help mitigate the high capital and operating costs and enhance the capacity to design and install innovative energy storage systems. This support will lead to improved RE availability and reliability. EBRD and IFC will ensure that activities under this sub-component align with other CIF programs, such as the CTF Global Energy Storage Program (GSEP), and with interventions by other development partners, creating valuable synergies.

**B) E-Mobility (EV Charging Stations):**

Activities will focus on identifying opportunities for private sector participation and financing for options promoting the adoption of e-mobility solutions, with a primary focus on expanding EV charging infrastructure.

EBRD and IFC have already engaged with several of their existing and new clients to explore new business opportunities in the e-mobility sector such as the leading players in EV infrastructure. Most of these companies are experienced energy generation/distribution companies trying to expand into EV business. The potential projects focus mostly on EV charging station investments, with the financing product of choice (i.e., debt, equity, etc.) being dependent on the financial strength of the potential counterparties. To date, EBRD has provided US$ 25 million financing for EV charging infrastructure development and the Bank’s intention is to increase its exposure in the sector to the extent possible and feasible.

EBRD has a private sector pipeline focused on EV charging infrastructure. EBRD is in discussions with a number of companies for an up to US$30-40 million financing for supporting EV business expansion. Investments are expected to start in 2025 in line with the EV adoption progress in the country.

IFC has a pipeline of private sector players looking to expand their EV charging infrastructure and is in early discussions with a selected number of EV charging infrastructure companies for an investment size of US$ 20-30 million financing (depending on the project size and overall investment need), expected to be implemented in 2025-26.

**C) Digitalization of the Power Distribution Grid:**

EBRD’s pipeline clients’ potential investments include operational technology systems such as wider smart metering coverage, SCADA upgrade at field level & grid control center, geographic information system integration and so on to reduce distribution losses, increase operational efficiency as well as reinforce grid flexibility helping RE integration.

EBRD is currently in talks with several companies for financing of up to US$10-15 million, dedicated to investments in digitalization and smart grid for distribution. Investments are expected to start in early 2025. This could be paired with gender-responsive capacity building and training support to ensure that the new technologies are adopted by the local workforce.

# V. Financing Plan and Instruments

##

## Requested Budget Envelope

This section presents the financing plan for the implementation of the activities proposed to be supported by Türkiye’s CTF-REI Program, including costs and sources of funding. The requested envelope for Türkiye´s CTF-REI amounts to US$70 m., of which US$68 m correspond to the CTF-REI financing, and grant financing of US$2 m.

Table 1 below presents how CTF-REI is to leverage and complement funding with regard to the two components.

**Table 1: Indicative Financing Plan for Türkiye’s CTF-REI IP**

|  | **Sub-components** | **Investment / TA** | **MDBs** | **MDB Share** | **CTF/REI** | **CIF/CTF****Grant** | **Private Sector** | **Gov/SOE/other** | **Total** | **Board Date** | **1st Disbursement date** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Component 1 (Phases 1 and 2): Transforming Power Transmission System for REI** |  |  |
| **Transforming Power Transmission System Project**  | Sub-component-1: Development of transmission infrastructure to facilitate scale-up of RESub-component-2: Strengthening of transmission networks and interconnectionsSub-component-3: Digital and smart-grid investments to strengthen grid operation and management | Investment | WB | 1,500 |  38 |  |  |  |  WB:1,538 | May 2025(Phase 1) | Sep. 2025 |
| Sub-component 4: Technical Assistance and Capacity Building  | TA | WB |  |  | 2 |  |  | 2 | May 2025(Phase 1) | Sep. 2025 |
| **Component 2: System Flexibility, Balancing, Stabilization and Strengthening Power Infrastructure** |  |  |
| **System Flexibility, Balancing, Stabilization and Strengthening Power Infrastructure**  | Component 2A: Battery Storage Component 2B: E-Mobility (EV Charging Stations)Component 2C: Digitalization of the Power Distribution Grid | Investment | EBRD & IFC | EBRD: 150IFC: 150 | EBRD: 15IFC: 15 |  | TBD[[28]](#footnote-29) | TBD | EBRD: 165IFC: 165 |  |  |
| **Component 3: Technical Assistance\*[[29]](#footnote-30)** |  |  |
| **System Flexibility, Balancing and Security of Supply** | Component 3A: Pumped Hydro Storage | TA | WB | 600 | \* |  |  |  | 600 | Jan. 2028 | Mar. 2028 |
| Component 3B: Hydropower energy efficiency | TA | WB | 300 | \* |  |  |  | 300 | Jan. 2026 | Mar. 2026 |
| **IP TOTAL** |  |  |  | **2,700** | **68** | **2** |  |  | **2,770** |  |  |

##

## Costs and Sources of Funding

CIF-REI resources will be allocated through the World Bank, IFC and EBRD and channelled to TEİAŞ and private sector clients.

**Components 1: Transforming the Power Transmission System for REI (US$ 1,500 m. World Bank, US$ 38 m CTF-REI financing for investments and US$2 m CTF-REI grant for TA).** Financing from CTF-REI is proposed to co-finance Transforming Power Transmission System Project, that will be financed by the World Bank in an amount of US$ 1,500 m. World Bank and US$38 m. CTF REI loan financing proposed to lower financing costs of this sizable project including REI and innovative investments and technical assistance projects, lengthen the loan periods and diversify its funding sources, thus better responding to the financing needs of private and public investors in sustainable energy in Türkiye. In addition, a US$2 m CTF grant financing will finance the TA activities under the sub-component 4 of the project.

The recipients of funding under this component will be TEİAŞ complying with the program’s eligibility criteria, fiduciary requirements and the environmental and social standards of the World Bank.

Costs, fees and financial conditions applicable to CTF-REI resources upon disbursement to TEİAŞ, correspond to CIF funds’ FY24 Financial Terms and Conditions.

**Component 2: System Flexibility, Balancing and Stabilization and Strengthening Power Infrastructure (US$150m EBRD, US$150m IFC, US$ 30m CTF).**

EBRD will provide US$ 50m in financing in addition to US$ 5m CTF funds for Battery Storage. EBRD will provide US$ 50m in financing in addition to US$ 5m CTF funds for E-Mobility (EV Charging Stations) and Digitalization of the Power Distribution Grid, respectively. IFC will deploy US$15m CTF-REI concessional resources in support of battery storage and E-Mobility (EV Charging Stations) and aim to leverage at least US$150m in own account financing. IFC will also seek to mobilize additional resources from private sector players and other partners.

# VI. Implementation Potential with Risk Assessment

Per the IP preparation guidelines, assessed country/regional risks include institutional, technology, environmental, social, and financial, as well as absorptive capacity for REI Program and associated investments.

## Macroeconomic risk

Macroeconomic risk is considered substantial. Key macroeconomic risks to the IP include: (a) any further significant depreciation of the currency and high inflation could raise construction costs and foreign exchange risk faced by sector entities; and (b) supply-side constraints due to a spike in imported intermediate goods and equipment price and as a result of the elevated pricing uncertainty could lead to delays in project implementation; and (c) geopolitical tensions in the region adversely affecting commodity and energy prices and causing a slowdown in the EU and other major markets also represent risks to the project. Sector entities generally have strong internal risk-based control systems and are well-placed to manage macroeconomic shocks. These characteristics will be considered for implementing entities yet to be selected. The World Bank will also continue to monitor macro-financial risk, engage with the authorities on economic policies, and offer technical assistance as requested by the Government.

## Institutional capacity for implementation and sustainability risk

TEİAŞ’ capacity has significantly increased during the implementation of the on-going and previous World Bank financed investment projects and technical assistance activities. The implementation of such large-scale REI investments requires a large and highly skilled team from TEİAŞ composed of technical, procurement and safeguards specialists. The Bank has continuously provided training on the new and updated policies and standards of the World Bank regarding these fields. During the procurement and implementation of the sub-projects, the World Bank will continue to support TEİAŞ’ activities through the review of documents and necessary trainings.

## Technology

Development of EV charging infrastructure and digitization elements in the power distribution sector do not represent a high technological risk based on international and local experience. However, battery storage technology so far known to few may carry a high technology risk when considering the current low track record, lack of economic feasibility, commercial availability, uncertainty in overall performance and assets’ useful life. In addition, the legislation with regard to battery storage needs revision to make the investments economically feasible.

## Environmental risk

In general, the environmental impacts from the program are expected to be positive given that the program supports renewable energy investments. The environmental risks related to the projects under the program that include construction activities are anticipated as (i) air pollution, noise and vibration from construction machinery during construction phase, (ii) soil disturbance and loss during earthmoving, (iii) tree-cutting and loss of vegetation, (iv) waste management, and (v) construction camp management, (vi) community health and safety (such as traffic safety) and (vii) potential impacts on culturally and naturally protected areas, which are mostly relevant to construction. The anticipated environmental impacts are mostly temporary, predictable and/or reversible, and the nature of the projects does not preclude the possibility of avoiding or reversing them. The potential impacts are medium in magnitude and in spatial extent.

In addition, climate change and disaster risks with regard to each investment under the World Bank financing are being screened during project preparation. Climate change and disaster risks, including the risks of earthquake, water scarcity, extreme heat, river flood, urban flood, tsunami, coastal flood, landslides, cyclone and volcano are screened for the locations of each proposed investment.

## Social Risk

Potential social risks related to the program may include labor, community health and safety, cultural heritage and land acquisition related issues. Specifically, for the Transforming the Power Transmission System Project, the electricity transmission lines (ETL) generally require purchasing small amounts of lands where permanent components of ETLs will be located. Despite the land acquisition impacts of ETLs are limited to tower and station locations, the acquisition of lands may still induce both physical and economic displacement. Although not very common, the locations of permanent components such as towers and stations may come across with the physical assets of nearby communities such as shelters, animal troughs, irrigation wells etc. and informal usage of public lands for agricultural or grazing purposes by project affected people who do not hold a title deed. The project may also affect nearby communities due to construction related impacts such as noise, dust, waste generation and traffic disturbance. The social risks related to the project described above can be minimized or mitigated by implementing appropriate measures.

## Financial risk

Transformation of the Power Transmission System Project - Phases 1 and 2, that is under preparation, doesn’t pose a substantial financial risk as TEİAŞ has been implementing World Bank financed projects for nearly two decades and the World Bank has been supporting TEIAS in increasing its institutional capacity in terms of “fiduciary”, namely “procurement” and “financial management” aspects in line with the requirements and standards of the World Bank.

## Absorptive capacity for REI Program and associated investments

As mentioned earlier, Türkiye's net zero commitment by 2053 to a sustainable and climate-resilient future are outlined in numerous strategies such as the NDP, Medium-Term Program, NEP and NEEAP so as to accelerate country’s green energy transition and decarbonization of the energy sector. This plan has the capacity to absorb the proposed CIF-REI Investment Plan of US$70 million plus US$2.7 billion to be leveraged. Türkiye's macroeconomic context, together with an existing comprehensive legal and regulatory framework, enables it to receive concessional financing as well as the technical assistance cooperation to support the country’s energy transition and renewable energy scale-up ambitions.

Both Türkiye´s financial system and developers´ execution capacities are suited to absorb required capital and project development challenges, in line with the decarbonization efforts and targets of the country. Furthermore, the offering of concessional resources through the CIF-REI program, targeting specific investments, represents a clear signal to investors interested in those pillars in which the country intends to accelerate its development.

MENR and its affiliates such as TEİAŞ have extensive technical capacity and experience with high-quality workforce and investments. Moreover, TEİAŞ is much familiar with the MDB, specifically World Bank, financed projects, and has the knowhow on how to comply with the international fiduciary, environmental, social standards. Despite the fact that the management of the energy state-owned enterprises change due to political agenda of the government, the institutional memory of these institutions allows the continuation of good work.

# VII. Monitoring and Evaluation

## Integrated Results Framework

Monitoring and evaluation of the Investment Plan will occur using an Integrated Results Framework (IRF), as described in this section. The IRF, based on the REI Monitoring and Reporting (M&R) System toolkit,[[30]](#footnote-31) includes a set of results indicators across the following levels: CIF impacts; REI program impacts; program outcomes (including co-benefits); and program outputs[[31]](#footnote-32), as elaborated in the CIF REI Integrated Results Framework in Annex 10. The Investment Plan’s four components relate to each level of results with a view to achieving program-level impacts as detailed below, responding to the whole of energy system analysis as described above.

## CIF Level Impacts

CIF Impact is the ultimate global mission to “achieve accelerated transformational change and climate financing that enable progress toward net-zero emissions and adaptive, climate-resilient development pathways, in a just and socially inclusive manner”. CIF Impact is measured through four standard indicators: CIF 1 Mitigation; CIF 2 Adaptation; CIF 3 Beneficiaries; and CIF 4 Co-Finance. Values for these indicators are aggregated from countries program- and project-level indicators as relevant.

The present IP is expected to contribute to the following CIF Impact indicators:

* CIF 1. Mitigation: GHG emissions reduced or avoided (Mt CO2 eq).
* CIF 4. Co-Finance: Volume of co-finance leveraged (US$).

CIF 1 and 4 correspond to respective program outcome indicators as detailed below.

## REI Program Level Impacts

The REI Program Impact is to “enable flexibility of energy systems for smooth integration of higher shares of variable renewable energy generation into the grid and increase in off-grid access to renewable energy”. The REI M&R System asks for Program impacts to be measured with 3 to 5 country impact indicators, selected by country recipients for the specific Investment Plan. These indicators are intended to be a high-level view of country progress on renewable energy integration which are not necessarily attributable to the investment plan alone. This IP proposes CTF Country Impact Indicators per proposed approaches for tracking and evaluating transformational change and inclusivity aspects.

**Table 2:** REI Program Impact Indicators for Türkiye REI Investment Plan

| **Program Impact Indicator** | **Baseline value** | **Target value (2030)** | **Source** |
| --- | --- | --- | --- |
| Increase renewable energy installed capacity | 11,292 MW solar;11,697 MW wind (2023) | 32,900 MW solar; 18,100 MW wind | Republic of Türkiye 2024**[[32]](#footnote-33)** |
| Increased battery capacity | 0 MW (2023)  | 2,100 MW [[33]](#footnote-34)  | As above. |
| Reduce carbon intensity of electricity  | 0.437 kg CO2/kWh (2020) | 0.352 kg CO2/kWh (20 percent reduction from 2024 level)[[34]](#footnote-35) | As above. |

## Program Outcome Results

Program outcome results cover four categories of indicators:

* REI Core Indicators, all nine of which must be reported for every project where relevant[[35]](#footnote-36);
* REI Co-Benefit Indicators, at least one of which must be reported for each project;
* Energy Storage indicators, which must be reported if the REI project being appraised contains an energy storage component; and
* Optional outcome indicators.

This IP proposes Program Outcome Indicators for the four components below. REI Core Indictors 1 (mitigation) and 6 (co-finance) correspond to CIF Impact Indicators 1 and 4 respectively. REI 2 (MW capacity) covers wind and solar power only, while REI 3 (GWh production) covers all renewable energy sources. REI 2 (MW capacity) will be taken as proxy for the World Bank Core Indicator ‘Renewable Energy Generation Capacity Enabled (MW)’, noting that the former includes wind and solar power only, while the latter covers all renewables. Additional outcome indicators, as shown below, draw on the REI Optional Indicators (numbered 1 through 7 at outcome level) from the REI M&R System toolkit.

Table 3: Program Outcome Indicators for Türkiye IP by Component

|  |  |  |  |
| --- | --- | --- | --- |
| Program Outcome Results Indicators | 1. Transforming the Power Transmission System for REI | 2. Power System Flexibility, Balancing, Stabilization and Strengthening Power Infrastucture | 3. Technical Assistance |
| **REI Core Indicators** |  |  |  |
| REI 1. Mitigation (Mt CO2 eq) | Applicable | Applicable | n/a |
| REI 2. Variable Renewable Energy Installed Capacity available to the grid (MW) – direct/indirect | Applicable | Applicable | n/a |
| REI 3. Renewable Energy Production (GWh/year) | Applicable | Applicable | n/a |
| REI 4. Grid Services (#) | Applicable | Applicable | n/a |
| REI 5. Policies |  | n/a |  |
| REI 6. Co-Finance (US$) | Applicable | Applicable | n/a |
| REI 7. Renewable Energy Access (# of people) – direct/indirect |  | Applicable |  |
| REI 8. System costs (US$/year) | n/a | Applicable | n/a |
| REI 9. Innovation (#) | Applicable | Applicable | Applicable |
| Program Outcome Results Indicators | 1. Transforming the Power Transmission System for REI | 2. Power System Flexibility, Balancing, Stabilization and Strengthening Power Infrastructure | 3. Technical Assistance |
| **Energy Storage Indicators** |  |  |  |
| GESP 1. Energy rating of storage system installed (MWh)  | n/a | Applicable | n/a |
| GESP 2. Power rating of storage system installed (MW) | n/a | Applicable | n/a |
| **REI Co-Benefit Indicators** |  |  |  |
| Varies per REI project | Must be reported by MDBs (at least one indicator) |
| **Optional Outcome Indicators** |
| REI Optional 1: Increase in grid interconnections to accommodate higher share of variable renewable energy (#) | Can be adopted by MDBs as they see fit; CIF Secretariat will aggregate information as available. |
| REI Optional 2: Reduced curtailment (% or MW) |
| REI Optional 3: Reduced loss of load (%) |
| REI Optional 4: Reduced reserve inadequacy (% or MW) |
| REI Optional 5: Reduction in unplanned system outages (#) |
| REI Optional 7: Number of innovative products, services, technologies, and processes that have entered a new market context  |

*[Elaborate details of how each project / component will contribute to these indicators. Note that the REI M&R System expects targets to be set for each indicator].* See respective annexes on each Component Brief for further details of results indicators and target values.

## Program Output Results

Program output result indicators are chosen for specific projects or components as applicable. These indicators are selected independently, drawing from REI Optional Indicators (numbered 8 through 18 for output level). See Table 4.

Table 4: Program Output indicators for Türkiye CTF-REI IP by component

| Program Output Results Indicators | 1. Transforming the Power Transmission System for REI | 2. Power System Flexibility, Balancing, Stabilization and Strengthening Power Infrastructure | 3. Technical Assistance |
| --- | --- | --- | --- |
| **REI Optional Output Indicators** |  |  |  |
| REI Optional 8: Number of policies, regulations, codes, or standards supported to enhance the enabling environment for renewable energy uptake (#) | Applicable | Applicable | Applicable |
| REI Optional 9: Number of technical/financial analyses completed to enhance the enabling environment for renewable energy uptake (#) | Applicable | Applicable | Applicable |
| REI Optional 10: Number of persons trained on issues related to renewable energy markets and systems (#) | Applicable | n/a | n/a |
| REI Optional 11: Number of supply management technologies, infrastructure, or other solutions deployed (#) | n/a | n/a | n/a |
| REI Optional 12: Number of demand management technologies, infrastructure, or other solutions deployed (#)  | n/a | n/a | n/a |
| REI Optional 13: Number of energy storage systems installed (#) | n/a | Applicable | n/a |
| REI Optional 14: Number of end-use electrification solutions deployed (#) | n/a | Applicable | n/a |
| REI Optional 15: Number of women and men reached with new end-use electrification solutions (# of people) | n/a | n/a | n/a |
| ES.1.10 Installed power generated by the YEKA method | n/a | Applicable | n/a |
| ES.1.11 Road map prepared for wind, solar and wave energy technologies | n/a | n/a | n/a |
| ES.2.2 Number of green charging stations | n/a | Applicable | n/a |
| ES.3.4 Number of smart grids installed | Applicable | Applicable | n/a |
| ES.3.6 Published “Digital in Energy in Türkiye Transformation Technologies Roadmap” (by 2025) | n/a | n/a | n/a |

Note: Indicators marked ‘ES’ refer to those in Republic of Türkiye (2024) Climate Change Mitigation Strategy and Action Plan 2024-2030.

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2. RE Legislation and Executing Authorities
3. Overview of the Power Sector
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8. Component 1 Brief
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10. The Correspondence on the Government’s Final Decision on the Components 1 and 3
11. CIF Integrated Results Framework Toolkit- Renewable Energy Integration Program

### ANNEX 1: Assessment of country’s absorptive capacity for integration activities

*Macroeconomic Context*

**Türkiye’s rapid growth in recent decades (4.2 percent in per capita terms on average over 2002-22) made it the 24th fastest growing country in the world over that period.** While the COVID-19 pandemic had a negative impact on growth, Türkiye still managed to have growth in 2020 (1.9 percent). This performance was largely due to the government’s economic response to the pandemic, focusing on loosening monetary policy and rapid credit expansion. Moreover, supported by domestic and external demand, Türkiye achieved double-digit GDP growth in 2021 (11.4 percent) and maintained significant momentum in 2022 (5.5 percent) and 2023 (4.5 percent).

**However, the policy framework that ensured strong economic performance also heightened macroeconomic risks and created vulnerabilities in the economy, which have been compounded by the effects of other recent shocks.** The country has been affected by persistently high inflation in recent months (69.8 percent in April 2024 after having peaked at 85.5 percent in October 2022) and the Turkish lira has depreciated sharply (336 percent against the dollar between January 2021 and April 2024). This was accompanied by a decline in Central Bank reserve buffers, which started to recover after the May 2023 elections. But even before the emergence of these challenges, there were concerns about growth prospects given: (i) declines in the contribution of total factor productivity[[36]](#footnote-37) to growth (down to 0.4 percentage points over 2016-2022 from 1.2 percentage points over 2004-2015); (ii) the trend and composition of investment, which since 2010 was mainly driven by residential and commercial property construction (i.e., a construction boom), despite a decline in recent years; and (iii) food price inflation diverging from global trends over the last ten years in Türkiye – also being higher than the overall inflation.

**Table 5: Türkiye: Key Economic Indicators**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **2020**  | **2021**  | **2022**  | **2023**  | **2024**  | **2025**  | **2026**  |
| **Real GDP growth, at constant market prices**  | 1.9  | 11.4  | 5.5  | 4.5  | 3.0  | 3.6  | 4.3  |
| Private Consumption  | 3.2  | 15.4  | 18.9  | 12.8  | 2.3  | 3.1  | 4.2  |
| Government Consumption  | 2.2  | 3.0  | 4.2  | 5.2  | 2.5  | 2.1  | 1.7  |
| Gross Fixed Capital Formation  | 7.3  | 7.2  | 1.3  | 8.9  | 2.9  | 2.9  | 3.1  |
| Exports  | -14.6  | 25.1  | 9.9  | -2.7  | 4.5  | 5.2  | 5.9  |
| Imports  | 6.8  | 1.7  | 8.6  | 11.7  | 3.7  | 4.2  | 5.6  |
| **Real GDP Growth, at constant factor prices**  | 1.2  | 11.9  | 6.5  | 4.5  | 3.0  | 3.6  | 4.3  |
| Agriculture  | 5.8  | -3.0  | 1.3  | -0.2  | 1.4  | 1.5  | 1.5  |
| Industry  | 3.0  | 17.1  | 1.1  | 0.8  | 4.6  | 4.8  | 5.0  |
| Services  | 0.2  | 14.6  | 9.8  | 4.4  | 2.5  | 3.3  | 4.2  |
| **Inflation (CPI), avg.**  | 12.3  | 19.6  | 72.3  | 53.9 | 57.8  | 28.9  | 16.4  |
| **Current Account balance (% of GDP)**  | -4.3  | -0.8  | -5.1  | -4.0  | -2.8  | -2.4  | -2.5  |
| **Net Foreign Direct Investment (% of GDP)**  | 0.6  | 0.8  | 1.0  | 0.4  | 0.9  | 1.1  | 1.4  |
| **Fiscal Balance (% of GDP)**  | -3.9  | -2.6  | -0.8 | -5.4  | -5.4  | -3.7  | -2.4  |
| **Debt (% of GDP)**  | 39.4  | 40.4  | 30.8  | 29.5 | 29.9  | 30.5  | 31.2  |
| **Primary Balance (% of GDP)**  | -1.1  | 0.0  | 1.4 | -2.5 | -0.8  | 0.6  | 0.7  |
| **Upper middle-income poverty rate (US$** **6.85 in 2017 PPP)** | 9.8  | 7.6  | 7.0  | 6.6  | 6.4  | 6.1  | 5.7  |
| Source: World Bank Macro Poverty Outlook for Türkiye, April 2024, and WB estimates. Notes: f = forecast. Poverty calculations based on SILC data from the TURKSTAT, actual data: 2021, nowcast: 2022-2023, forecasts are from 2024 to 2026.  |

**The heterodox policies introduced before May 2023 to stabilize the lira, reduce dollarization, and direct credit to selected sectors also led to distortions in the financial sector.** In that context, banks and corporations grew more sensitive to exchange rate volatility and liquidity risks because of their reduced, yet still considerable, amount of foreign exchange (FX) denominated liabilities. The introduction of extensive regulatory forbearance, including a relaxation of the nonperforming loan (NPL) classification criteria and the option for banks to apply a more favorable FX rate when calculating risk-weighted assets and capital adequacy ratio, has somewhat shielded the banking sector. But this added a layer of complexity to the policy adjustment efforts.

**Following the May 2023 elections, the Government has taken steps towards normalizing the economy in a gradual way in order to manage risks associated with the adjustment process.** This includes monetary policy tightening, with interest rates increasing from 8.5 percent in May to 50 percent in March 2024, the unwinding of distortive financial regulations, and fiscal revenue measures to curtail the fiscal deficit. Markets are reacting positively with 5-year CDSs declining from around 700 basis points (bps) in May 2023 to below 300bps in May 2024, major rating agencies upgrading their outlook to positive recently, and two of them (Fitch & S&P) upgrading the credit rating (to B+) on March 8, 2024 and May 3, 2024 respectively. The authorities are also contemplating how to complement these actions with structural reforms that may help with growth prospects going forward. These efforts will need to be sustained and supported in the coming months because the monetary, fiscal and macro-prudential challenges and associated economic vulnerabilities were of such magnitude that despite the significant progress, there is some road ahead.

**The economy is expected to slow this year as it continues to adjust from the previous policy stance, followed by an expected acceleration in growth in outer years.** After growing by 5.5 percent in 2022 and 4.5 percent in 2023, Türkiye’s economic growth is projected to initially slow to 3.1 percent in 2024 before recovering to 3.9 percent in 2025 and 4.7 percent in 2026.In response to the recent monetary tightening, inflation should decline gradually supporting higher investment and growth as well as further progress on poverty and inequality. Fiscal consolidation after 2024 (when the earthquakes recovery and reconstruction efforts will peak), macro-financial stabilization, and policy support to exporters should also further narrow the current account deficit. Poverty is projected to stay at 7.8 percent in the next few years.

**Future growth prospects will also be affected by developments associated with the global climate change agenda.** The EU CBAM is perhaps the most tangible example. The EU will place a fee on the import of certain emissions intensive products to create a level playing field for domestic producers subject to the EU emissions trading system. The CBAM applies to a select group of the most emissions intensive and trade exposed sectors, although it is likely to expand to other sectors over time. It entered into application in its transitional phase in October 2023 and the permanent system will enter into force beginning in 2026. Türkiye is a large producer of emissions intensive products (5th largest cement producer and 8th largest steel producer), and the EU is Türkiye’s largest trading partner, absorbing 41 percent of Türkiye’s total goods exports. Initially, the iron and steel sector [[37]](#footnote-38) including articles is of most concern: 40.5 percent of Türkiye’s likely covered exports in this sector are absorbed by the EU at a value of around US$7.7 billion. Aluminum is also exposed with 59 percent of exports going to the EU. However, Türkiye could capitalize on progress in decarbonizing its power sector, its proximity to EU markets, and strong existing trade relationships to grow its exports to the EU if it decarbonizes its industrial base ahead of other countries.

**Türkiye’s tourism industry, a major contributor to GDP and the most important source of export revenue, is being impacted by climate change.** Regional distribution of tourism activity and investment is closely correlated with climate risk. For example, Antalya Province, accounting for almost half of the country’s tourism accommodation, suffers from the most frequent meteorological disasters of any province, with over 370 events recorded between 2010 and 2021. The hotel sector faces an especially acute decarbonization challenge due to the long asset-life of most hotel properties. This concentration of tourism infrastructure offers opportunities to invest collectively in climate adaptation and mitigation measures, sharing the costs and risks among a range of stakeholders. For policymakers and private actors, the challenge is to sustain the sector’s growth while reducing emissions, reinforcing climate resilience, and offering innovative value propositions for less carbon intensive, climate resilient tourism products.[[38]](#footnote-39)

*Legal, Regulatory and Institutional Context:*

**The Turkish electricity market reform began in early 2000s with the enactment of EML No. 4628, so as to increase competition and sustainable growth in the market.** The EML not only identified major market activities in a liberalized environment, but also laid the foundation for the establishment of the necessary bodies, such as EMRA in 2001 as an autonomous body responsible for regulating the market, and Energy Exchange (EPIAS) in 2006, operating spot and future electricity and natural gas markets. EPIAS is also expected to start Emission Trading Market in 2024.

As explained in Annex 2, there is a strong legal and legislative framework, as well as the responsible experienced institutions, in Türkiye with regard to REI context.

*Technical and Management Context*

**MENR and its affiliates such as TEİAŞ have extensive technical capacity and experience with high-quality workforce and investments.** Moreover, TEİAŞ is very familiar with the MDB, specifically World Bank, financed projects, and has the know-how on how to comply with the international fiduciary, environmental, and social standards. Despite the fact that the management of the energy state-owned enterprises changes due to political agenda of the government, the institutional memory of these institutions allows the continuation of good work. [[39]](#footnote-40)

### ANNEX 2: RE Legislation and the Executing Authorities

* Electricity Market Law, numbered 6446 (EMRA),
* Law on the Use of Renewable Energy Sources for Electrical Energy Generation numbered 5346 (Council of Ministers – the President),
* Geothermal Resources and Natural Mineral Waters Law numbered 5686 (Council of Ministers – the President),
* Presidential Decrees numbered 1044, 2949, and 7189,
* Electricity Market Licensing Regulation (EMRA),
* Regulation on Certification and Support of Renewable Energy Sources (EMRA),
* Competition Regulation Regarding Provisional License Applications to Establish a Wind or Solar Energy Based Production Facility (EMRA)
* Regulation on Renewable Energy Resource Guarantee Certificate in the Electricity Market (EMRA)
* Regulation on Storage Activities in the Electricity Market (EMRA)
* Regulation On Unlicensed Electricity Generation in the Electricity Market (EMRA)
* Regulation on Renewable Energy Resource Areas (MENR)
* Regulation on the Procedures and Principles Regarding the Signing of a Water Use Right Agreement to Carry Out Generation Activities in the Electricity Market (State Hydraulic Works – DSI - General Directorate)
* Regulation on the Use of Geothermal Resource Areas for Electrical Energy Generation (MENR)
* Geothermal Resources and Natural Mineral Waters Law Implementation Regulation (MENR)
* Regulation on Solar Energy Based Electricity Generation Facilities (MENR),
* Regulation on the Technical Evaluation of Solar Energy Based Electricity Generation Applications (MENR)
* Regulation on the Technical Evaluation of Applications for Wind Resource-Based Electricity Generation (MENR)
* Regulation on the Connection of Wind Power Plants to the Wind Power Monitoring and Forecasting Center (MENR)
* Domestic Components Regulation (MENR)
* Communiqué on Wind and Solar Measurements Applications for Wind and Solar Energy Based License Applications (The Minister to whom the General Directorate of Meteorology is affiliated).

### ANNEX 3: Overview of the Power Sector

Türkiye’s electricity market has undergone extensive reform since 2001 with the enactment of Electricity Market Law (EML) no:4628, through market liberalization, establishment of an autonomous energy regulatory authority, unbundling, privatization, and the establishment of organized power markets.

With EML, eligible consumer concept, licensing for market entrance, regulated third-party access to transmission and distribution grid, and functional unbundling were introduced. However, in time, so many amendments were made to EML due to the requirements of market implementation. This situation necessitated the renewal of EML. In that direction, the new EML numbered 6446 was enacted on the 14th of March 2013.

The aim of the electricity market reform is the transformation of the sector’s structure starting from a vertically integrated monopolistic system to eventually reach a market structure where full retail competition is achieved.

In EML, the electricity market activities were defined as generation, transmission, wholesale, distribution, retail sale, system operation, and market operation. Among these activities, transmission, distribution and incumbent retail sales (ineligible customers and supply of last resort) as well as EUAS’s wholesale to distribution companies (for losses and general lighting) and incumbent suppliers are regulated. On the other hand, generation, wholesale and retail sales to eligible customers are free market activities open to competition.

Distribution and retail sales activities have been legally unbundled since January 1st, 2013, and incumbent supplier concept was introduced. Incumbent suppliers are the suppliers that can sell electricity to ineligible and last-resort customers in a pre-determined region which matches with the electricity distribution region.

Before the Reform, Türkiye Electricity Distribution Corporation (TEDAS) was the owner and operator of all distribution regions in Türkiye. Distribution regions were restructured as 21 subsidiaries of TEDAS and all privatized between 2008 and 2013. The ownership of the distribution assets remained with TEDAS, and operational rights were transferred to the private companies. Following the privatization process, electricity distribution activities are performed by Distribution Companies (DistCos) in regions indicated in their respective licenses. DistCos are to operate and maintain the distribution grid, carry out necessary grid investments, provide non-discriminatory electricity distribution and connection services to all system users including eligible consumers connected and/or to be connected to the distribution system.

DistCos also have to prepare regional demand projections and distribution investment plans for required distribution facilities to be constructed in the regions specified in their licenses. TEDAS still remains as the asset owner and audits the investment by the authority of MENR. EMRA approves distribution investments.

Following the electricity market liberalization process in 2001, the private sector gained the chance to construct power plants on its own by bearing the risk of investment. Since then, the private sector obtaining a license from the Energy Market Regulatory Authority (EMRA) could invest in constructing a new generation facility or attend public generation facilities’ privatization auctions to generate electricity. At the time of liberalization, there was some private sector participation in generation activities in the form of Build Operate Transfer (BOT), Build Own Operate (BOO), Transfer of Operational Rights (TOOR), and auto production (self-generation). BOT and TOOR generators are operating State-owned generation facilities so, at the end of their contract period, assets are transferred to a public company, Electric Generation Co. (EUAS). Thermal and small hydro generation assets under the control of EUAŞ have gradually been privatized and on the other hand, at the end of their contract period, some TOOR and BOT facilities were transferred to EUAS, waiting to be privatized again.

EUAS, however, will continue to have and operate high-capacity Reservoir Hydroelectric Power Plants (HPPs) as those are very effective in keeping the transmission system stable and controlling frequency. Also, some strategic HPPs are located on border crossing rivers and should be operated by a public company for geopolitical reasons.

With the introduction of unlicensed generation[[40]](#footnote-41), real persons in addition to legal persons had gained electricity generation opportunities for their needs using renewable energy sources.

In the liberalization process, generation and wholesale activities were separated from the mother company Türkiye Electric Generation and Transmission Company (TEAS) and a new public company was established to carry out only transmission and its related activities. Other transmission assets under the control of private companies were gathered under The Turkish Electricity Transmission Company (TEİAŞ). Hence TEİAŞ became a regulated public monopole company. Currently, TEİAŞ is the only authorized company to construct and operate transmission systems except for generation companies whose generation facilities are near the country border and may construct transmission facilities up to the border to export electricity to neighboring countries with unit dedication[[41]](#footnote-42) method. Also, if TEİAŞ does not have sufficient financing or cannot make timely investment planning to connect a new generation facility to the grid, such investments may be made or financed by the subject generation facility licensee on behalf of TEİAŞ.

The transmission lines and transformer station data of TEİAŞ as of the end of April 2024 are given in Table 6 below. 66 kV transmission lines and transformers were constructed by a concessionary company in the past and they are being transformed to 154 kV gradually.

Table 6: Transmission Lines of TEİAŞ

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **TRANSMISSION LINES (km)** | **400 kV** | **220 kV** | **154 kV** | **66 kV** | **TOTAL** |
| National Grid Overhead Lines | 25,381.81 | - | 47,824.74 | 99.03 | 73,305.58 |
| International Interconnection Overhead Lines | 633.00 | 85.35 | 227.80 | 20.50 | 966.65 |
| Total Overhead Lines | 26,014.81 | 85.35 | 48,052.54 | 119.53 | 74,272.23 |
| National Grid Underground Cables | 86.96 | - | 531.75 |  | 618.71 |
| National Grid Submarine Cables | 24.78 | - | - | - | 24.78 |
| **TOTAL** | 26,126.55 | 85.35 | 48,584.29 | 119.53 | 74,915.72 |

Table 7: Transformers of TEİAŞ

|  |  |  |  |
| --- | --- | --- | --- |
| **Voltage**  | **Number of Transformer Stations** | **Number of Transformers** | **Transformer Installed Capacity (MVA)** |
| Total | Connected to Abroad |
| 400 | 125 | 7 | 441 | 92,078 |
| 220 | - | - | - | - |
| 154 | 672 | 4 | 1701 | 134,548 |
| 66 | 1 | 3 | 19 | 243 |
| TOTAL | 798 | 14 | 2161 | 226.869 |

The main tasks of TEİAŞ are to carry out load distribution and frequency control, to operate the ancillary services market and balancing power market within the scope of the market operation license, to monitor real-time system reliability, to determine the necessary ancillary services to ensure system reliability and the provision of electrical energy under the stipulated quality conditions. Also, to make a transmission investment plan for the new transmission facilities envisaged to be established, to establish new transmission facilities, to operate the transmission system per the competitive environment in the generation and supply of electrical energy, and to invest in substitution and capacity increase in the transmission system when necessary. Also, in line with the decision of the MENR, international interconnection studies are conducted.

Since September 18, 2010, the Turkish Electricity System has been operated in synchronous parallel with the European Network of Electricity Transmission System Operators (ENTSO-E) via interconnections with Greece and Bulgaria. There are interconnections with other neighboring countries that do not meet ENTSO-E standards so direct energy flow is not possible since the electricity quality is not the same in exporting and importing countries. For such cases, either back-to-back DC connections are used for asynchronous parallel operations like the ones with Georgia and with Persia. For interconnections with Azerbaijan, Iraq, and Syria, either an isolated region is formed in the importing country, or an electricity generation facility is isolated from the exporting country's system to act as a facility of the importing country's system.

For new generation investments, until October 1st of each year, TEİAŞ prepares and publishes a report on the capacities of regional generation facilities that can be connected to its systems on a connection point and/or regional basis, for the following five and ten years.

TEİAŞ has a National Load Dispatch Center in Ankara and 9 regional load dispatch centers throughout the country. Depending on the regional electricity supply–demand balance, 15 tariff regions are determined. Generation and consumption facilities connected to the transmission grid in these regions should pay the transmission fee based on the the tariff valid for that region. The transmission tariff is determined and proposed by TEİAŞ and approved by EMRA to cover all expenses of TEİAŞ.

The main market players are as follows:

* MENR – determines the policy for the sector.
* EMRA – prepares secondary legislation and regulates, monitors, audits and approves tariffs.
* TEİAŞ– the state-owned transmission company, also operates the system, balancing power market and ancillary services market.
* EUAS – the state-owned generation and trading company, also acting as the party of guaranteed energy contracts.
* Distribution companies – private companies operating distribution regions which are owned by TEDAS, the state-owned distribution company.
* Incumbent suppliers – private retail sales companies in distribution regions, supplying electricity to non-eligible and last-resort consumers.
* Suppliers – private companies supplying electricity to eligible consumers and other suppliers.
* EPIAS – the market operator established under commercial law which operates the organized wholesale power markets and financially settles the transactions made in these markets.
* Organized Industrial Zones (OIZ) – industrial areas which can generate and distribute electricity in their zones.

The eligible consumer concept was introduced with EML in 2001 and the eligibility threshold was determined as 9 GWh per year to be effective as of 3 March 2003. Consumers directly connected to the transmission grid or OIZs are also considered eligible. This limit has been reduced regularly and for 2024 it is determined as 950 kWh per annum[[42]](#footnote-43). Practically almost all consumers are eligible and either purchase their electricity needs from the market or incumbent supplier in their region at the last-resort tariff[[43]](#footnote-44). However, household and agriculture consumers who have an annual consumption of 100 m. kWh/annum or less, are allowed to purchase electricity from their assigned suppliers at the last resort consumer tariff[[44]](#footnote-45).

In the Türkiye Electricity Market, there are spot markets such as Day Ahead Market, Intraday Market, Balancing Power Market (Power Exchange), and Futures Market in operation currently. There is also a YEK-G market, which enables the monitoring, proof, and disclosure that the energy used by end consumers is produced from renewable energy sources. On the technical side, for system reliability and stability an Ancillary Services Market is operated by TEİAŞ.

The new EML amended the provisions for license exemptions also. The following renewable facilities are exempt from setting up a company and obtaining a license for generating electricity[[45]](#footnote-46):

Generation facilities that use renewable energy sources with a maximum installed capacity of 5 MW[[46]](#footnote-47) ;

Renewable generation facilities consume all the electricity that they generate, without feeding it into the transmission or distribution systems and whose generation and consumption are at the same measurement point.

Market activities carried out within the scope of electricity storage and demand-side participation within the framework of the limits, procedures, and principles to be determined by the EMRA Board in consultation with MENR.

Generation facilities based on renewable energy sources, provided that the capacity is limited to twice the contractual power in the connection agreement by municipalities and their affiliates, industrial facilities and facilities for agricultural irrigation, and other persons limited to the contractual power in the connection agreement.

Also, some activities carried out by irrigation facilities, and irrigation associations using renewable energy sources are exempt from setting up a company and obtaining a license.

### ANNEX 4: Previous CIF / CTF Program in Türkiye

CIF’s investment in Türkiye has been through its Clean Technology Fund (CTF) since 2012. Türkiye’s US$440 m., multiphase CTF investment plan has been supporting wind power expansion, smart grid upgrades, and complementary programs with local banks and leasing companies to address market barriers and drive investments in renewable energy and energy efficiency.

In the first phase alone (through end-2012), US$172 m. from the investment plan helped to mobilize US$1.8 billion through 430 subprojects via local financial intermediaries. Savings have amounted to 902,000 tons of carbon dioxide equivalent and US$568 m. in avoided oil imports per year.

A summary of Türkiye’s experience with CTF programs in collaboration with CIF partner MDBs is provided in Table 8. In addition to the financing from the CTFs and MDBs, co-financing from private sector sources was also mobilized through the CTF programs and projects.

Table 8: CTF-MDB Co-Financing in Türkiye (in US$ millions)

|   | **MDB** | **CTF** | **Total** |
| --- | --- | --- | --- |
| **World Bank** |
| Renewable Energy Integration Project (P144534)- on-going  | 625 | 50 | 675 |
| Renewable Energy Integration Technical Assistance Project (P155510)- closed  |  | 1  | 1 |
| Private Sector EE and RE (P124898)- closed  | 1,000 | 100 | 1,100 |
| Energy Efficiency in Public Buildings Projects- 1 and 2 (P162762)- on-going | 450 | 50 | 200 |
| Geothermal Development Project (P151739)- on-going  | 550 | 39.8 | 589.8 |
| Accelerating the Market Transition for Distributed Energy PfR  | 664.4 | 30 | 694.4 |
| Sub-Total: World Bank | 3289.4 | 270.8 | 3,260.2 |
| **IFC** |
| Commercializing Sustainable Energy Finance  | 101.8 | 20.5 | 122.3 |
| Commercializing Sustainable Energy Finance Program Phase II  | 66.8 | 34.7 | 101.5 |
| Sub-Total: IFC | 168.6 | 55.2 | 223.8 |
| **EBRD** |
| Türkiye Sustainable Energy Financing Facility (TurSEFF) (fully disbursed; implementation ongoing) | 193.0 | 46.7 | 239.7 |
| Türkiye Residential Energy Efficiency Finance Facility (TuREEFF) (fully disbursed; implementation ongoing) | 115.0 | 42.0 | 157.0 |
| Near Zero Waste (NØW) Programme (fully disbursed; implementation ongoing) | 156.1 | 12.1 | 168.3 |
| Türkiye Climate Stars (fully disbursed; implementation ongoing) | 396.6 | 24.3 | 420.9 |
| High Climate Impact for the Corporate Sector Programme (1 sub-project in Türkiye approved under this regional programme; implementation ongoing) | 44.4 | 8.1 | 52.5 |
| Türkiye Green Cities Programme (1 sub-project in Türkiye approved under this regional programme; implementation ongoing) | 74.9 | 5.4 | 80.3 |
| Sub-Total: EBRD | 980.1 | 138.5 | 1,118.6 |
| **TOTAL** |  |  |  |

### ANNEX 5: Development Co-Benefits

**Human Capital and Gender**

**Renewable energy employment worldwide has steadily expanded, with an estimated 13.7 m. direct and indirect jobs in 2022.** Energy technology innovation, private and public-sector investments, and state, local, and federal energy and climate policies have driven economic development and supported the creation of millions of jobs globally. Many governments prioritize renewable energy development not only to reduce emissions and achieve international climate goals but also to pursue broader socio-economic benefits, including human capital and gender equality. Jobs serve as a tangible benefit, providing individuals, regardless of gender, with a stake in this transformative process. However, various analyses indicate that these advantages have not been equitably distributed across the energy sector workforce, highlighting a notable gender gap. This gap is particularly evident in skilled trades, technology innovation and commercialization, and upper-level management roles in rapidly growing industries such as renewable energy development. In the energy sector, women constitute 25% of the workforce, despite being 47% of the total national workforce. The International Energy Agency (IEA) reports that women in energy earn nearly 20% less than men, even with similar skills, education, and experience. Additionally, in renewable energy, women represent 32% of the workforce[[1]](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?ui=en-US&rs=en-US&actnavid=eyJjIjo2OTk3MzA2MDR9&wopisrc=https%3A%2F%2Fworldbankgroup-my.sharepoint.com%2Fpersonal%2Fyakcollu_worldbank_org%2F_vti_bin%2Fwopi.ashx%2Ffiles%2Fe707eb6c377a4d31a071760d257a38bb&wdenableroaming=1&mscc=1&wdodb=1&hid=06AC1AA1-701F-5000-314D-D803156EFD0A.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=98d52f8e-e63f-2e38-f681-110f952976ff&usid=98d52f8e-e63f-2e38-f681-110f952976ff&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Fworldbankgroup-my.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdorigin=Outlook-Body.Sharing.DirectLink&wdhostclicktime=1711956788428&instantedit=1&wopicomplete=1&wdredirectionreason=Unified_SingleFlush#_ftn1).

**Türkiye is well-poised to push the frontiers on gender equity thanks to robust human and economic foundations.**  Its long-standing institutions and human capital progress have helped drive growth for decades, paving the way for the green and digital transition. These assets are key to continuing its economic recovery following the global financial crisis (2008-9), spillover effects from regional conflicts regarding migration and trade, the Coronavirus pandemic effects, and the 2023 earthquakes in southeastern Türkiye.

**Maximizing human capital utilization and minimizing labor underutilization remains a key frontier for broadening growth in Türkiye.** Over the last generation (1990-2022), Türkiye’s female human capital utilization in terms of labor force participation rate was initially at 37 percent in 1990, decreased to 23.3 by 2005, and rose to nearly 35 percent by 2020-2022. This compares modestly to countries discussed later like Chile and Mexico that started at lower levels in 1990 but reached over 45 and 41 percent, respectively, by 2020-2022 nearly in line with OECD levels[[2]](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?ui=en-US&rs=en-US&actnavid=eyJjIjo2OTk3MzA2MDR9&wopisrc=https%3A%2F%2Fworldbankgroup-my.sharepoint.com%2Fpersonal%2Fyakcollu_worldbank_org%2F_vti_bin%2Fwopi.ashx%2Ffiles%2Fe707eb6c377a4d31a071760d257a38bb&wdenableroaming=1&mscc=1&wdodb=1&hid=06AC1AA1-701F-5000-314D-D803156EFD0A.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=98d52f8e-e63f-2e38-f681-110f952976ff&usid=98d52f8e-e63f-2e38-f681-110f952976ff&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Fworldbankgroup-my.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdorigin=Outlook-Body.Sharing.DirectLink&wdhostclicktime=1711956788428&instantedit=1&wopicomplete=1&wdredirectionreason=Unified_SingleFlush#_ftn2). Over 2014-2022, Türkiye saw an expansion of the labor underutilization rate overall from 14 to 17 percent[[3]](https://usc-word-edit.officeapps.live.com/we/wordeditorframe.aspx?ui=en-US&rs=en-US&actnavid=eyJjIjo2OTk3MzA2MDR9&wopisrc=https%3A%2F%2Fworldbankgroup-my.sharepoint.com%2Fpersonal%2Fyakcollu_worldbank_org%2F_vti_bin%2Fwopi.ashx%2Ffiles%2Fe707eb6c377a4d31a071760d257a38bb&wdenableroaming=1&mscc=1&wdodb=1&hid=06AC1AA1-701F-5000-314D-D803156EFD0A.0&uih=sharepointcom&wdlcid=en-US&jsapi=1&jsapiver=v2&corrid=98d52f8e-e63f-2e38-f681-110f952976ff&usid=98d52f8e-e63f-2e38-f681-110f952976ff&newsession=1&sftc=1&uihit=docaspx&muv=1&cac=1&sams=1&mtf=1&sfp=1&sdp=1&hch=1&hwfh=1&dchat=1&sc=%7B%22pmo%22%3A%22https%3A%2F%2Fworldbankgroup-my.sharepoint.com%22%2C%22pmshare%22%3Atrue%7D&ctp=LeastProtected&rct=Normal&wdorigin=Outlook-Body.Sharing.DirectLink&wdhostclicktime=1711956788428&instantedit=1&wopicomplete=1&wdredirectionreason=Unified_SingleFlush#_ftn3) but nearly double among women, particularly reflecting the COVID pandemic and labor market contraction. Women’s labor force participation in Türkiye lags that of men by a factor of at least 2:1, aggravated due to COVID and global uncertainty facing growth.

**Renewable energy investments will provide a new window of opportunity to boost human capital and gender equality.** A recent study by United Nations Development Program (UNDP) and International Labor Organization (ILO) indicates that investments in renewable energy will generate 300.000 new jobs in Türkiye[[47]](#footnote-48). This would be a unique opportunity to equip women with market-relevant skills and promote their enhanced access to employment in renewable energy industry while contributing greater gender equality across the country.

**Throughout the FY2018-FY2023, the share of active gender-tagged projects of the World Bank have averaged 87 percent while reaching 100 percent levels in FY19, FY20, and FY23.** The World Bank program continued to bring significant benefits to women and vulnerable groups through its lending, trust funded activities and (Analytical and Advisory) ASA interventions., including the energy and climate related interventions.

### ANNEX 6: Stakeholder Consultations

Türkiye´s CTF-REI Investment Plan is the result of a consultative process, led by the MoTF to identify and prioritize lines of action in which financing support mechanisms are required to accelerate the integration of RE. This plan has been conceived as an important instrument to advance in the energy transition and climate action paths the country has set, policy wise, towards 2035 and 2053.

Performed consultation process included ministries, government institutions, MDBs, Non-Profit Organizations (NGO), Thinktanks and representatives from the private sector and academia.

Throughout the preparation of the IP, two major consultations were held, the first of which took place during the Scoping Mission performed in November 2022, which was used to start conversations with different levels of government and relevant stakeholders. The participants of the Scoping MIssion included IFC, EBRD, World Bank and representatives from several ministries and institutions including MoTF, MENR, Ministry of Environment, Urbanization and Climate Change (MoEUCC), the Strategy and Budget Office, Ministry of Trade (MoT), Ministry of Industry and Technology (MoIT), Ministry of Transportation and Infrastructure (MoTI), Türkiye Energy, Mine and Nuclear Research Institute (TENMARK), Energy Market Regulatory Agency (EMRA), the Scientific and Technological Research Council of Türkiye (TUBİTAK), Turkish Electricity Transmission Company (TEİAŞ), Türkiye Industrial Development Bank (TSKB), Türkiye Development and Investment Bank (TKYB), Türkiye Industry and Business Association (TUSİAD), Independent Industrialists and Businessmen's Association (MÜSİAD). Participants are listed in Table 9. Based on these discussions, the main strategic themes that should be included in this IP were identified.

Following the extensive discussions during the scoping mission to identify the priority areas for the investment plan based on the energy strategies and priorities in Türkiye, the following areas were selected for further discussion and elaboration in the scoping mission:

1. Strengthening and further digitizing the power transmission system and facilitating large-scale renewable energy integration.
2. Increasing the efficiency of the existing hydropower projects.
3. Storage of electricity both as battery storage and pumped hydro storage.
4. Supporting e-mobility.
5. Generation, storage, transportation and usage of green hydrogen.

The following consultations took place during the three Joint Mission carried out in January, April and May 2024. The Mission was composed of IFC, EBRD, World Bank and representatives from several ministries and institutions including MoTF, MENR, Ministry of Transportation and Infrastructure (MoTI), Türkiye Energy, Mine and Nuclear Research Institute (TENMARK), Energy Market Regulatory Agency (EMRA), Turkish Electricity Transmission Company (TEİAŞ), Türkiye Industry and Business Association (TUSİAD), as well as the private sector companies (Koc Holding, Borusan Holding, Guris Holding) and Think Tanks (Shura). Participants of the 1st Joint Mission are listed in Table 10. Mission discussed in detail and identified the major activities to be included in the IP.

* The three Joint Missions, dated January 17-18-19, April 3 and May 21, 2024, met all the objectives, and identified potential activities to be included in the IP, as follows:
1. Transformation of the Power Transmission System for REI (Investment project)
2. Private sector projects (Investment projects)
	1. E-mobility infrastructure
	2. Battery Storage
	3. Digitalization and smart grid for distribution
3. Technical Assistance (TA) for
	1. Pumped hydro storage,
	2. Hydropower energy efficiency,
	3. Streamlining policy for renewable energy regulation and
	4. Capacity building for power transmission system operator (TEİAŞ) with activities such as
		1. TA for introduction of HVDC,
		2. Capacity Building and Training for SCADA/EMS, and
		3. System Management for variable REI.

Finally, the draft of the IP was published for comments on the MoTF´s website on June X, 2024, receiving comments from relevant stakeholders, associations and the general public, which were considered for the final round of revision to which the document was subjected leading to this final presented version.

**Table 9: Participants of the Scoping Mission from November 2-3, 2022**

|  |  |  |
| --- | --- | --- |
| **Name Surname** | **Institution** | **Position** |
| Özgür SARHAN | Ministry of Energy and National Resources | Acting Head of Department |
| Engin BOSTANCI | Ministry of Energy and National Resources | Acting Head |
| Gözde ERTEMİR | Ministry of Energy and National Resources | Specialist |
| Merve ŞENOL ÖNEY | Ministry of Energy and National Resources | Specialist |
| Yaprak Serenay TAŞKIN | Ministry of Energy and National Resources | Assistant Specialist |
| Dr. Yelda ALTINSOY | Ministry of Energy and National Resources | Engineer |
| Muhammed Baki AKSU | Ministry of Energy and National Resources | Assistant Specialist |
| Yusuf Çağrı VEYİSOĞLU | Ministry of Energy and National Resources | Assistant Specialist |
| Furkan YARDIMCI | The Electricity Generation Corporation | Engineer |
| Yücel KARTAL | The Electricity Generation Corporation | Head of Department |
| Zafer SONBAY | The Electricity Generation Corporation | Branch Manager |
| Ali LOĞOLU | The Electricity Generation Corporation | Branch Manager |
| Selma ÜLKER | The Electricity Generation Corporation | Assistant Director |
| İlknur ATAN | The Electricity Generation Corporation | Chief  |
| Mehmet KEMİKLİ | The Electricity Generation Corporation | Assistant Manager |
| Kürşat DAL | The Electricity Generation Corporation | Engineer |
| Ozan OLGUNER | The Electricity Generation Corporation | Engineer |
| Dilek CİVAK ERDAŞ | Energy Market Regulation Authority | Head of Group |
| Okan YARDIMCI | Energy Market Regulation Authority | Head of Group |
| Hakan KAYSI | Energy Market Regulation Authority | Energy Specialist |
| Mehmet YALILI | Energy Market Regulation Authority | Energy Specialist |
| Mustafa Çağrı PEKER | Energy Market Regulation Authority | Energy Specialist |
| Melih YETİŞ | Energy Market Regulation Authority | Energy Specialist |
| Mehtap ALPER SAĞLAM | Energy Market Regulation Authority | Energy Specialist |
| Alaaddin Emre EVGALLIOĞLU | Energy Market Regulation Authority | Energy Specialist |
| Metin SEVER | Energy Market Regulation Authority | Energy Specialist |
| Nidanur YILDIRIM | Energy Market Regulation Authority | Energy Specialist |
| Handan KAYALAK | Energy Market Regulation Authority | Assistant Energy Specialist |
| Dr. Celal ERBAY | Turkish Energy, Nuclear and Mineral Research Agency | Energy and Technology Policy Coordinator |
| İrem IŞIK ÇETİN | Turkish Energy, Nuclear and Mineral Research Agency | Specialist |
| Damla KESTEL ERDOĞAN | Ministry of Trade | Trade Specialist |
| Didem ARTUNÇ ÜNALTEKİN | Ministry of Trade | Trade Specialist |
| Erhan ÇALIŞKAN | Development Investment Bank of Türkiye | Director |
| Pınar Bahar YÜCEL | Development Investment Bank of Türkiye | Senior Specialist |
| Hande Merçan AYGEN | Ministry of Industry and Technology | Acting General Director |
| Mehmet Ali YILMAZ | Ministry of Industry and Technology | Acting Head of Department |
| E. Meriç MERİÇLİ TAŞAN | Ministry of Industry and Technology | Specialist |
| Gökçe Kangal | Ministry of Industry and Technology |  Assistant Specialist |
| Ayşe Sena Akdeniz | Ministry of Industry and Technology | Assistant EU Expert |
| Elif Gökçe Öz | Directorate of Climate Change | Head of Department |
| Emre Acar | Directorate of Climate Change | Economist |
| Dr. Bengu Ozge Akyurek | Directorate of Climate Change | Specialist |
| Ece Coşkuntürk | Industrial Development Bank of Türkiye | Director |
| Bahadır Koçaker | Industrial Development Bank of Türkiye | Group Executive |
| Tulu Ertem | Industrial Development Bank of Türkiye | Director |
| Orçun Yıldızca | Industrial Development Bank of Türkiye | Manager |
| Faruk CİRİT | Presidency of Strategy and Budget | Assistant General Manager |
| Feyza ELDENİZ | Presidency of Strategy and Budget | Head of Department |
| Hatice Hilal ŞEN | Presidency of Strategy and Budget | Head of Department |
| Emre ÇALIŞKAN | Presidency of Strategy and Budget | Strategy and Budget Expert |
| Tülay MORSÜNBÜL PARMAKSIZ | Presidency of Strategy and Budget | Strategy and Budget Expert |
| Berna TUNCER | Presidency of Strategy and Budget | Assistant Strategy and Budget Expert |
| Mustafa İMAMOĞLU | Ministry of Transport and Infrastructure  | Head of Department |
| Hayrettin BEYHAN | Ministry of Transport and Infrastructure  | Branch Manager |
| Ufuk KOCA | Ministry of Transport and Infrastructure  | Engineer |
| Sinan OĞUZ | Ministry of Transport and Infrastructure  | Head of Department |
| Dr. Banu YAĞCI | Ministry of Transport and Infrastructure  | Statistician |
| Merve ŞİMŞEK | Ministry of Transport and Infrastructure  | Engineer |
| Eylem CEYLAN | Ministry of Transport and Infrastructure  | Transportation and Communication Specialist |
| Alperen AKAR | Ministry of Transport and Infrastructure  | Engineer |
| AHMET BERKAN KORKMAZ | Director General of Civil Aviation | Coordinator |
| EMRE ZAİMOĞLU | Director General of Civil Aviation | Aviation Specialist |
| Adnan KÜCE | Ministry of Transport and Infrastructure  | Environmental Engineer  |
| Osman PEMPECİ | Ministry of Transport and Infrastructure  | Environmental Engineer  |
| Büşra Günaydın | Ministry of Transport and Infrastructure  | Engineer |
| Açelya Yenilmez | Ministry of Transport and Infrastructure  | Stakeholder Engagement Specialist |
| Defne Arısoy | Ministry of Transport and Infrastructure  | Environmental Specialist |
| Özlem MULUN AKPINAR | Ministry of Transport and Infrastructure  | EU Expert |
| Mustafa İnsel | The Port Operators Association | Prof.Dr. |
| Tuba YENİLMEZ | General Directorate of Highways | Environmental Management Chief |
| Hatun ÖKSÜZTEPE | General Directorate of Highways | Environmental Engineer  |
| Elçin Soyhan KURTULMUŞOĞLU | General Directorate of State Airports Authority | Specialist |
| Songül KOCADAYI ESEN | General Directorate of State Airports Authority | Economist  |
| Gülhan KARAKULAK | General Directorate of State Airports Authority | Electrical Engineer |
| Aykut KARAKOCA | General Directorate of State Airports Authority | Electrical Engineer |
| Emine Zeynep BİLGİLİ | General Directorate of Turkish State Railways | Certified Engineer  |
| Coşkun BİLGİN | General Directorate of Turkish State Railways | Environmental Engineer  |

**Table 10. Participants of the Joint Missions (1,2 and 3) dated January 17-19, April 3 and May 21, 2024**

| **Name**  | **Surname** | **Institution Name** | **Position/Title** |
| --- | --- | --- | --- |
| Stephan | Garnier | WB | Deputy Country Director, Lead Energy Specialist |
| Yesim  | Akcollu | WB | Team Leader for Türkiye CIF/CTF Program, Senior Energy Specialist |
| Alan David | Lee | WB | Senior Energy Specialist |
| Frank | Van der Vleuten | WB | Advisor |
| Megan | Meyer | WB | Senior Energy Specialist |
| Eyup  | Mermer | WB | Program Assistant |
| Sedef  | Kaynarkan | WB | Program Assistant |
| Andrey  | Shlyakhtenko | IFC | Senior Operations Officer, Blended Finance |
| Tendai | Madenyika | IFC | Operations Officer, Blended Finance |
| Sule | Kilic | EBRD | Associate Director, Deputy Head Türkiye |
| Andrea | Iro | EBRD | Associate Manager, Donor Partnerships  |
| Gianpiero |  Nacci | EBRD | Director, Climate Strategy and Delivery |
| Cristian | Carraretto | EBRD | Associate Director, Climate Strategy and Delivery  |
| Muharrem | Askin | EBRD | Principal, Climate Strategy and Delivery  |
| David | Managadze | EBRD | Associate Director, Sustainable Infrastructure Group  |
| Sumeet | Manchans | EBRD | Associate Director, Climate Strategy and Delivery |
| Tatevik  | Dadivanyan | EBRD | Climate Finance Specialist, Climate Strategy and Delivery  |
| Mehmet Erdem | Yasar | EBRD |  Associate Director |
| Jimmy  | Pannett | CIF Secretariat | Energy Specialist  |
| Daniel  | Morris | CIF Secretariat | Senior Climate Change Specialist  |
| Maria Ann  | Dumpert | CIF Secretariat | ET Consultant |
|   |   |   |   |
| Dr. Nurşen  | Numanoglu | TUSIAD | Deputy Secretary General, Industrial Transformation, Sectorial Policies |
| Hazal | İnce  | TUSIAD |   |
| Elif | Taşyürek | TUSIAD |   |
| Hale  | Onursal Hatipoğlu | TUSIAD | Deputy Secretary General - External Relations |
| Mehmet | Acarla | TUSIAD | Head of Energy Working Group, Borusan |
| Vahit | Yazici | TUSIAD | Manager, Government Relations & Sustainability Incentives, Brisa Bridgestone Sabancı |
| Bahar | Arslan  | TUSIAD | Development Engineer, Brisa Bridgestone Sabancı |
| Volkan  | Yigit | TUSIAD | Managing Partner, Aplus Enerji Yatırım Danışmanlık  |
| Burak | Yitgin | TUSIAD | Business Development Manager, Aplus Energy |
|   |   |   |   |
| Murat | Gordeslioglu | BORUSAN | CFO |
|   |   |   |   |
| Tuba | Yalim | MOTF | Head of Department |
| Ozge  | Bilgin | MOTF | Assistant Treasury and Finance Expert |
| Arda | Uludag | MOTF | Treasury and Finance Expert |
| Aygün | Demirors | MOTF | Treasury and Finance Expert |
| Elif Gozde | Doyuran | MOTF |   |
|   |   |   |   |
| Obahan  | Obaoğlu | KOC HOLDING | Official Relations Manager |
| Arda  | Ozlu | KOC HOLDING | CFO |
| Yagiz  | Caglar | KOC HOLDING | Finance Director |
| Ayhan  | Ozan | KOC HOLDING | Finance Manager |
| Volkan  | Akturk | KOC HOLDING | Business Development Director |
| Betul | Kok | KOC HOLDING | Business Development Manager |
| Ozkan  | Basar | KOC HOLDING | Business Development Supervisor |
| Yener | Buyukgursan | KOC HOLDING | Senior Business Development Specialist |
|   |   |   |   |
| Ufuk | Bor | EUD | CFO |
| Taskin  | Kizilok | EUD | Representing EÜD Board - IC Enterra General Manager |
| Mustafa Murat | Orhan | EUD | EÜD Secretary General |
| Gamze | Soylu | EUD | Expert |
| Fuat | Yildiz | EUD |  Executive Assistant |
|   |   |   |   |
| Yael | Taranto | SHURA | Analyst |
|   |   |   |   |
| Engin  | Bostanci | MENR | Department of Foreign Investment Coordination, Head of Department |
| Merve  | Senol | MENR | Department of Foreign Investment Coordination |
| Gozde  | Ertemir | MENR | Department of Foreign Investment Coordination |
|   |   |   |   |
| Nevin | Erturk | TEİAŞ | Head of PIU |
| Serhat | Metin | TEİAŞ | Head of Planning and Investment Management |
| Murat | Akgunduz | TEİAŞ | Manager of Expense Accruals |
|  |   |   |   |
| Yesim  | Erdemir | GURIS | Project Deputy F'nance Manager |
| Zeyep  | Bodrumlu Cetin  | GURIS | Project Finance Supervisor |
| Derya  | Sozen Onder  | GURIS | Project Finance Supervisor |
|   |   |   |   |
| Yücel | Kartal | EUAS | Head of Department |
| Etem | Camci | EUAS | Head of Department |
|   |   |   |   |
| Esma  | Dilek | UAB | Deputy Director General |
| Murat Mustafa  | Harman | UAB |   |
| Ozgur | Talih | UAB |  |

### ANNEX 7: Existing activities in the field of renewable energy, particularly activities of other development partners

1. **Summary of the World Bank’s Engagement in the Türkiye Energy Sector**

**In June 2022, the World Bank’s Country Climate and Development Report (CCDR) on Türkiye was published**. It has provided a practical pathway for a net-zero transition which would deliver significant economic, social, and environmental benefits. The World Bank current and planned engagement in Türkiye is fully aligned with the CCDR recommendations.

**The World Bank’s energy portfolio in Türkiye currently includes six operations, amounting to over US$3 billion, which will be expanded with a healthy pipeline of new operations amounting to nearly again US$3 billion.** The World Bank’s energy sector portfolio consists of four projects that contribute to enabling renewable energy capacity (Renewable Energy Integration, Geothermal Development, Public and Municipal RE and Accelerating the Market Transition for Distributed Energy), four in energy efficiency (Energy Efficiency in Public Buildings - 1 and 2, Seismic Resilience and Energy Efficiency in Public Buildings, Organized Industrial Zones) and one in the gas sector (Gas Storage Expansion Project – GSEP). In 2023, these projects have already facilitated the generation of 956 MW of renewable energy, with an expectation to contribute to 2,273 MW by 2028. Additionally, three technical assistance projects have been recently approved, two under European Union (EU) IPA II - Phases 3 and 4, and one to support PMI. The World Bank’s decarbonization program is set to grow with a new pipeline including Transforming Power Transmission System for REI Projects– Phases 1 and 2 (IBRD US$1.5 billion in total, FY26 and FY28).

**Investment Operations:**

* **Renewable Energy Integration Project (IBRD US$625 m. and CTF US$50 m.)** REIP aims to assist Türkiye in meeting its increased power demand by strengthening the transmission system and facilitating large-scale renewable energy generation.
* **Energy Efficiency in Public Building Projects 1 and 2 (IBRD US$450 m. and CTF US$50 m.)** In 2019 and 2024, the Bank approved two energy efficiency projects in an amount of a US$500 m.in total (US$450 m. IBRD, US$50 m. CTF) to support energy efficiency renovations of public buildings with the Ministry of Environment, Urbanization, and Climate Change and the Ministry of Energy and Natural Resources.
* **Gas Storage Expansion Project (IBRD US$600 m.).** GSEP aims at increasing the reliability and security of gas supply in Türkiye by expanding underground gas storage capacity in the country.
* **Geothermal Development Project (IBRD US$550 m. and CTF US$39.8 m. and ESMAP US$0.35 m.).** The project development objective is to scale up private sector investment in geothermal energy development in Türkiye.
* **Public and Municipal Renewable Energy Project (IBRD EUR500 m.)** aims to scale-up renewable energy (RE) generation for self-consumption in central government buildings.
* **Accelerating the Market Transition for Distributed Energy Program (IBRD EUR600 m. + CTF US$ 30 m. + ESMAP US$ 3 m.).** Approved in March 2023, the development objective of this Program-for-Results (PforR) is to expand Türkiye’s distributed solar photovoltaic market and pilot distributed battery electricity storage to increase renewable energy. The PforR is the first operation in a broader Europe and Central Asia Renewable Energy Scale-Up (ECARES) multiphase programmatic approach (MPA) with the objective to increase renewable energy capacity in participating countries of the ECA region. CTF US 30 m. from the Global Energy Storage Partnership (GESP) supports distributed battery energy storage systems that help to enable renewable energy.

***Technical Assistance Interventions***

* **Energy Sector Support under EU-IPA Phase IV for offshore wind** (EU IPA Grant of EUR7.98 m., executed by MENR),
* **Energy Sector Support under EU-IPA Phase III** (EU IPA Grant of EUR3.65 m., executed by MENR),
* **Partnership for Market Implementation Facility - Carbon Market Development Project** (PMI Facility Grant of US$4.95 m., executed by MEUCC).
* **Energy Transition Program of Advisory Services and Analytics** (Energy Sector Management Assistance Program Trust Fund grants executed by the World Bank)

**Pipeline Development in Türkiye**

The pipeline and potential energy sector pipeline operations that will be financed by the World Bank are as follows:

**Pipeline**

* **Second Energy Efficiency in Public Buildings (EEPB-2) - (IBRD EUR300 m.).** This Project is a follow-up to the ongoing Türkiye Energy Efficiency in Public Buildings Project. The proposed development objective is to cost-effectively reduce energy use in central government buildings. Two proposed components are: (i) energy efficiency investments in central government buildings; and (ii) technical assistance and implementation support.
* **Transforming Power Transmission System for REI - Phase 2** (IBRD US$750 m., FY26)

**Potential Pipeline for FY26 and Beyond**

* **The Hydropower Energy Efficiency (Rehabilitation) Project** - (IBRD US$200-250 m.),
* **Transforming Power Transmission System for REI - Phase 2** (IBRD US$750 m.)
* **Development of the First Hydropower Pumped Storage in Türkiye** (discussions are ongoing with MENR and TEİAŞ) - (IBRD US$500-750 m.)
1. **Summary of IFC’s Engagement in the Türkiye Energy Sector**

In Türkiye, IFC has leveraged more than US$3 billion to support private-sector efforts designed to increase energy generation, improve energy efficiency, and mitigate the impacts of climate change. IFC investments include 10 power generation projects with an installed capacity of 4,300 megawatts (MW), as well as power distribution projects that have reached improving services for 3.9 million customers. Building on World Bank reforms in the country, IFC has been a long-term investor, supporting the comprehensive reform of the sector. These efforts have successfully spurred innovation and created new markets, resulting in greater access to reliable electricity, accelerated economic growth, and an increase in labor force participation. IFC continues to finance power generation to meet Türkiye’s growing medium to long-term needs. Strengthening the distribution network is also a key priority for increasing renewable energy integration and resilience. In April 2024, the World Bank Country Partnership Framework FY24-FY28 was approved. IFC, together with IBRD and MIGA, will continue to support projects aimed at increasing renewable energy production, as well as modernizing transmission and distribution networks. IFC remains keen to support the adoption of new clean technologies such as battery storage energy systems (both stand-alone and consolidated into renewable generation facilities), which will scale up the renewable generation and diversify the country’s generation mix as well as build up the resilience of power system.

1. **Summary of the EBRD’s Engagement in the Türkiye Energy Sector**

In the past 10 years, the EBRD has invested EUR2 billion across 30 projects in Türkiye's energy sector (incl. renewables, energy efficiency, power distribution, etc). To date, the Bank has invested EUR 9 billion in supporting renewables, including large solar and wind projects. The EBRD has also invested in one of the largest geothermal power plants in the world, which alone increased Türkiye’s geothermal capacity by 30 per cent. Those investments also contributed the strengthening of human capital in the sector by promoting the green and digital skills development of prospective workforce (i.e. design, maintenance, remote management of WPPs) via nationally accredited certifications granted by local education institutions. They also supported workforce diversity of the companies through the development and implementation of Equal Opportunity Action Plans.

The Bank is also closely cooperating with national authorities to create an enabling environment for economy-wide decarbonization. For example, the EBRD has assisted the local government in developing the Renewable Energy Action Plan (in line with the EU’s Renewable Energy Directive) and in designing post-2020 renewable energy support schemes based on competitive tendering and the National Energy Efficiency Action Plan (NEEAP).

Moreover, to help Türkiye achieve its net-zero target by 2053, the EBRD has supported the country to develop low-carbon pathways (LCPs) for 4 hard-to-abate industrial sectors, including steel, cement, aluminum and fertilizers. The LCPs show that, to decarbonize the selected four sectors, investments of more than US$ 70 billion are needed to reduce emissions by 135 million tCO2 annually compared to BAU. Türkiye launched a national Industrial Decarbonization Platform at Cop28 in Dubai to drive decarbonization efforts and investments across sectors. Massive deployment of renewables, with adequate grid and storage investments, will be required to accompany this ambition.

EBRD is also exploring small battery storage project that is at early stage. EBRD expects to receive increased interest for financing requests in this area starting from 2025.

Moreover, to help Türkiye achieve its net-zero target by 2053, the EBRD has supported the country to develop low-carbon pathways (LCPs) for 4 hard-to-abate industrial sectors, including steel, cement, aluminum and fertilizers. The LCPs show that, to decarbonize the selected four sectors, investments of more than US$ 70 billion are needed to reduce emissions by 135 million tCO2 annually compared to business-as-usual (BAU). Türkiye launched a national Industrial Decarbonization Platform at COP28 in Dubai to drive decarbonization efforts and investments across sectors. Massive deployment of renewables, with adequate grid and storage investments, will be required to accompany this ambition.

### ANNEX 8. Component 1 Brief: Transforming the Power System for REI

*Problem Statement*

Türkiye aspires to achieve carbon neutrality by 2053, but reaching such a goal requires major changes in its energy system. Türkiye’s ratification of the Paris Agreement in October 2021 and its pledge to achieve net zero emissions by 2053, were strong signals of the country’s commitment to tackle climate change. As indicated in the World Bank’s Türkiye Country Climate and Development Report (CCDR, 2022), Türkiye can also improve energy security through an accelerated pace of least-cost investments in domestic solar and wind—building on its track record of tripling renewable energy capacity in the last decade and investing in energy efficiency, battery, and pumped storage, geothermal, and gas generation with carbon capture and storage.

The country’s high dependency on energy imports poses security of supply risk, as well as a high energy bill. Türkiye’s energy imports (99 percent of gas and 93 percent of), accounting for almost 20 percent of Türkiye’s total imports in 2021, contributes to massive current account deficit (nearly US$51 billion in 2021).

Scaling up RE is a core government development policy, critical to both strengthen energy security and achieve the country’s 2053 net zero emission target. Türkiye is endowed with considerable RE resources, including solar, wind, and geothermal. Utilizing these RE resources and achieving energy security has long been at the core of the government strategy. According to the 2022 NEP, by 2035, the installed capacity of solar and wind is targeted as 52.9 GW and 29.6 GW (24.6 GW onshore, 5 GW offshore), respectively, thus an additional 41.5 GW of solar, 12.8 GW onshore wind and 5 GW offshore wind facilities are planned to be constructed in the coming 11 years (by 2035). Government’s ambitious RE scale up program necessitates strengthening and further digitizing the power transmission system and facilitating large-scale renewable energy integration.

*Implementation Readiness*

Implementation of this project requires commitment by the Government and the implementing agency TEİAŞ, which has already been endorsed by the official request letter sent by the MoTF to the World Bank in January 2024 for the financing of this project by the World Bank and CIF co-financing.

The proposed project activities will be implemented by TEİAŞ in its roles as the electricity transmission system owner and operator. TEİAŞ is very familiar with the high quality MDB standards, specifically the World Bank’s policies and guidelines, including the procurement, financial management and safeguards aspects. In the last decade it has implemented four other World Bank and/or CTF-REI funded projects, including Renewable Energy Integration Project (REIP), ECSEE APL2, ECSEE APL3, ECSEE APL6, the TEK Restructuring and the National Transmission Grid projects, all of which were completed satisfactorily.

The eligibility of any new or revised investments under the project shall be appraised and selected in accordance with standards, criteria and procedures acceptable to the World Bank, which shall include determining that the proposed investments: (i) are technically feasible; (ii) are economically and financially viable; (iii) are demand and needs driven; (iv) are environmentally sustainable; and (v) are, and can be designed and implemented in manner, in compliance with the World Bank's fiduciary requirements and Environmental and Social Standards, including, as appropriate, the application of the environmental review and land acquisition procedures.

*Rationale for CTF Financing*

The sub-projects to be financed by this component shall fall within either of following categories:

1. Development of transmission infrastructure to facilitate scale-up of RE, by integrating the RE to the transmission grid in a timely and efficient manner,
* Strengthening of transmission networks and interconnections, to cater to growing demand and supply of electricity in Türkiye,
* Digital and smart-grid investments to strengthen grid operation and management, and
* Technical Assistance and Capacity Building activities to help TEİAŞ improve its REI capacity, including but not limited to technical assistance for introduction of HVDC capacity building and training for SCADA/EMS, and system management for VRE integration.

All of these shall contribute to current or future integration of scaled up RE investments and technologies with significant potential for long-term greenhouse gas emissions savings.

*Results Indicators*

The indicative result indicators to be monitored throughout the execution of this project within CTF-REI Investment Plan for Türkiye are as follows:

|  |
| --- |
| 1. Reduction in CO2 emissions (Mt CO2 eq)[[48]](#footnote-49)  |
| 2. Variable Renewable Energy Installed Capacity in Türkiye (MW)  |
| 3. Renewable Energy Production in Türkiye (GWh/year)  |
| 4. Co-Financing (US$)  |
| 5. RE capacity connected to sub-stations funded under the project (GW) |
| 6. RE generated from plants connected to sub-stations funded under the project (GWh) |
| 7. Percentage of grievances recorded by the Project and resolved within one-month period (%) |
| 8. Transmission lines constructed or rehabilitated under the project (km)[[49]](#footnote-50)  |

*Financing plan, including financial instruments*

Financing from CTF-REI is proposed to co-finance Transforming Power Transmission System Project, that will be financed by the World Bank in an amount of US$750 m., as a response to the Government’s official request from the World Bank. The CTF-REI is proposed to co-finance US$60 m. of the sub-component 1 and sub-component 2, to lower its financing costs of this sizable project, lengthen the loan periods, and diversify its funding sources, thus better responding to the financing needs of private and public investors in sustainable energy in Türkiye. In addition, a US$3 m CTF grant financing is being sought by the Government to finance the TA activities under the sub-component 4 of the project. In case, this cannot be realized, the same amount of concessional CTF-REI financing is requested.

*Project preparation timetable for Phase 1:*

The major milestones and their respective timeline with regard to the project, as agreed with the Government are as follows:

* Concept review : September 2024
* Project appraisal : December 2024
* Negotiations : March 2025
* World Bank Board of Executive Directors’ approval : May 2025
* Effectiveness and start of implementation : September 2025

### ANNEX 9: Component 2 Brief: Power System Flexibility, Balancing and Stability and Strengthening Power Infrastructure

Sub-Components:

1. Battery Storage (EBRD and IFC)
2. E-Mobility (Electric Vehicle (EV) Charging Stations) (EBRD and IFC)
3. Digitalization of the Power Distribution Grid (EBRD)
	1. **Battery Storage (EBRD and IFC)**

## *Problem statement*

Türkiye faces critical challenges in its energy sector, marked by a growing demand for electricity, increasing penetration of renewable energy sources, and a need for grid stability. These challenges highlight the urgent requirement for significant investments in battery storage infrastructure and technologies throughout the country. Despite having more than 50% of installed power generation from renewable sources, actual generation in the country is heavily dependent on fossil fuel. Government of Türkiye’s RE scale up plan can only address decarbonization concerns if battery storage is also adopted and implemented successfully in tandem.

By embracing battery storage investments as a cornerstone of its energy transition strategy, Türkiye can unlock a range of benefits, including enhanced grid stability, reduced carbon emissions, improved energy security, and economic growth. However, achieving these objectives will require collaboration amongst government, industry stakeholders, and the broader energy community to overcome regulatory barriers, mobilize investment, and accelerate the adoption of battery storage solutions across the country.

## *Proposed contribution to initiating transformation*

The Turkish battery storage market is set for substantial growth, driven by the effects of recent storage pre-license applications and the National Energy Action plan targets. More than 25 GW of battery storage licenses have been awarded, translating into more than US$ 20 billion required investments in the medium term. However, it is worth noting that despite the regulatory progress, private sector players are still in the early stages of understanding costs associated with building battery storage systems and navigating their revenue structures. Consequently, clients in EBRD and IFC’s pipelines are primarily interested in developing trial battery storage projects with smaller capacities to assess system functionality before committing to larger future investments. Enabling such early mover transformational battery storage projects will require concessional financing due to the nascent stage of the storage industry.

## *Implementation readiness*

Private sector activities closely follow developments in the market, driven by the regulatory and policy regime set by the Government of Türkiye. It is expected that projects will start gaining traction in 2025. EBRD has completed concept review for a potential project with an approximate investment volume of US$ 5 million and is in discussions with the client regarding project details. Further, EBRD expects to receive increased interest for financing requests for battery storage starting from 2025. IFC is considering several potential projects with energy storage and expects a requirement of US$ 15-20 million concessional financing to be applied in early 2025.

## *Rationale for REI financing*

Financing battery storage projects is crucial for enhancing grid flexibility and integrating higher shares of variable renewable energy. These projects address technical and operational barriers, stabilize the grid, and support off-grid access to clean energy. By providing ancillary services and improving market design, battery storage accelerates the transition to a low-carbon energy system in line with the Paris Agreement's goals.

## *Results indicators*

Refer to indicators in Section VIII. Monitoring and Evaluation and elaborate their definitions and targets.

The final list of indicators will be available during the project preparation stage. Anticipated outcomes of the project include the following.

|  |
| --- |
| 1. Greenhouse gas (GHG) emissions reduction/avoidance (metric tons/year)
 |
| 1. Installed capacity of variable renewable energy available to the grid (MW)
 |
| 1. Annual renewable energy output (MWh)
 |
| 1. Increase in available grid services and improvements (see examples below)
 |
| * 1. # of new front-of-the-meter (utility-scale) battery storage systems installed
 |
| * 1. # of new behind-the-meter (residential or commercial and industrial) battery storage systems installed
 |
| 1. Financing mobilized, including from MDBs and other parties
 |

* 1. **E-Mobility (EV Charging Stations) (EBRD and IFC)**

## *Problem statement*

Türkiye, as a rapidly developing nation with a burgeoning population and growing urbanization, is confronted with a pressing challenge: the escalating environmental and economic toll of conventional transportation systems. The reliance on fossil fuel-powered vehicles in Türkiye's transportation sector has led to severe environmental impacts, including detrimental air quality, and heightened greenhouse gas emissions. Additionally, the dependence on imported fossil fuels and unsustainable energy consumption increases the country’s vulnerability to global energy price fluctuations, which adversely affects energy security and economic growth. To combat these issues and foster a more sustainable future, there is an urgent need for substantial investments in e-mobility infrastructure and technologies across Türkiye. Decarbonization of the transportation system is not only a key pillar of the country's net zero carbon path by 2053, but also a way to stimulate economic growth. Decarbonization initiatives such as electric vehicles and related transportation infrastructure can stimulate economic growth by creating new industries, jobs, and business opportunities in the clean energy sector.

By taking decisive action to transition towards e-mobility, Türkiye can mitigate environmental degradation, reduce fossil energy dependency, alleviate urban congestion, improve air quality, reduce noise pollution, and seize the economic opportunities presented by technological innovation in the burgeoning clean energy sector. However, achieving these goals will require concerted efforts from government, industry stakeholders, and civil society to overcome barriers and accelerate the adoption of sustainable transportation solutions across the nation.

## *Proposed contribution to initiating transformation*

With the increasing adoption of EVs, there is a growing need for infrastructure to support EV adoption in Türkiye. As of November 2023, the number of EVs amounted to 80,043, representing 0.53% of the total vehicle fleet in the country, meaning that there is significant growth potential. Furthermore, the increase of EVs on traffic was 5.5-fold in 2023 evidencing the need for accelerated investments in the EV infrastructure. According to the statement made by the Ministry, the number of EV charging sockets, which was 3,378 in 2023, is expected to increase to 37,946 in 2053 to support the EV scale up. Charging infrastructure must, therefore, grow in tandem with vehicle sales to ensure an efficient and extensive transition to EVs.

The proposed project will focus on identifying opportunities for private sector participation and financing for options promoting the adoption of e-mobility solutions. This project will primarily focus on expanding EV charging infrastructure.

## *Implementation readiness*

The National Energy and Mining Policy announced by the Ministry of Energy and Natural Resources in 2019 set a target for electric and hybrid vehicles to constitute 30% of all vehicles in Türkiye by 2030. The updated NDC of Türkiye, announced in 2023, listed the main mitigation policies in the transport sector until 2030. Among other policies, i) increasing the use of electricity instead of fossil fuels on highways, ii) promotion of electric vehicles by establishing a national fast charging station network are included in the NDC. The Medium-Term Development Plan (2024-2026) also refers to the policy to enhance charging station network to promote electric vehicles, encourage the use of domestic electric vehicles under the Green Transformation section. The Ministry of Industry and Technology and Energy Market Regulatory Authority (EMRA) are leading the efforts to establish the legislation for Electric Vehicles charging infrastructure. A set of regulations was unveiled in February 2022. The Ministry also prepared a support program and tendered out the installation of 1,572 units of fast-charging stations across the country by April 2023. According to EMRA, there are more than 6,058 charging stations installed by January 2024. EMRA has already provided licenses to 152 companies for the installation of electric charging stations.

Ambitious government targets, coupled with regulations and incentives, are helping to drive the e-mobility market and EV adoption in the country. Several private sector companies are currently considering investments to expand EV charging infrastructure, spurred on by the strong policy support for electrification. EBRD and IFC engagements can support this developing pipeline in Türkiye, with a view to finance projects that can establish a track record to help accelerate the deployment of e-mobility technologies to decarbonize the transport system.

EBRD and IFC have already engaged with a number of its existing and new clients to explore new business opportunities in the e-mobility sector such as the leading players in EV infrastructure. Most of these companies are experienced energy generation/distribution companies trying to expand into EV business. The potential projects focus mostly on EV charging station investments, with the financing product of choice (i.e., debt, equity, etc.) being dependent on the financial strength of the potential counterparties.

To date, EBRD has provided US$ 25 million financing for EV charging infrastructure development and the Bank’s intention is to increase its exposure in the sector to the extent possible and feasible. EBRD has a private sector pipeline focused on EV charging infrastructure. Notably, prominent energy players are actively investing in EV infrastructure, and our team is well-informed about the pipeline clients in this sector. Currently, EBRD is in discussions with a number of companies for an up to US$ 30-40 million financing to support the expansion of EV charging infrastructure. The investments are expected to start in 2025 in line with the EV adoption progress in the country. IFC has a pipeline of private sector players looking to expand their EV charging infrastructure and is in early discussions with a selected number of EV charging infrastructure companies for an investment size of US$ 20-30 million financing, expected to be implemented in 2025-26.

## *Rationale for REI financing*

The suggested interventions in the sector of e-mobility are in line with REI’s overall objective of enhancing RE enabling technologies including for transportation and overall decarbonization. CIF REI concessional finance support is needed to address market barriers through a programmatic approach, tackling barriers outlined in Section II Country Context. Additionally, the CIF REI financing will help overcome first-mover costs, build confidence among local stakeholders and communities, and accelerate the participation of private sector players and commercial lenders along the process.

## *Results indicators*

Refer to indicators in Section VIII. Monitoring and Evaluation and elaborate their definitions and targets.

The final list of indicators will be available during the project preparation stage. Anticipated outcomes of the project include the following:

|  |
| --- |
| 1. Greenhouse gas (GHG) emissions reduction/avoidance (metric tons/year)
 |
| 1. Installed capacity of variable renewable energy available to the grid (MW)
 |
| 1. Increase in new smart-charging EV stations installed (#)
 |
| 1. Financing mobilized, including from MDBs and other parties
 |

* 1. **Digitalization of the Power Distribution Grid (EBRD)**

## *Problem statement*

Türkiye's energy sector is grappling with a myriad of challenges, including rising energy demand, aging infrastructure, inefficiencies in distribution systems, and the need for greater integration of renewable energy sources. To address these challenges and build a more resilient, efficient, and sustainable energy system, there is a pressing need for substantial investments in digitalization and smart grid technologies for distribution networks across the country.

By embracing digitalization and smart grid technologies for distribution networks, Türkiye can enhance energy reliability, improve operational efficiency, integrate renewable energy sources, and build a more resilient and sustainable energy infrastructure for the future. However, achieving these objectives will require a concerted and coordinated effort to drive innovation, mobilize investment, and facilitate the transition to a smarter, more adaptive electricity grid across the country.

## *Proposed contribution to initiating transformation*

Electricity distribution companies have started to invest in digitalization and smart grid for electricity distribution systems for the last decade. As the regulator body does not approve some of the new technologies under the regulated asset base, companies require financial support to expedite digitalization, implement smart grid systems for the electricity distribution system and upskill their workers with necessary digital skills. Our pipeline clients’ potential investments include operational technology systems such as wider smart metering coverage, SCADA upgrade at field level & grid control center, geographic information system integration and so on to reduce distribution losses, increase operational efficiency as well as reinforce grid flexibility helping RE integration.

The EBRD Banking team is currently in talks with several companies for financing of up to US$ [10-15] million, dedicated to investments in digitalization and smart grid for distribution. The investments are expected to start in early 2025. This could be paired with gender-responsive capacity building and training support to ensure that the new technologies are adopted by the local workforce.

## *Implementation readiness*

The EBRD Banking team is currently in talks with several companies for financing of up to US$ 10-15 million, dedicated to investments in digitalization and smart grid for distribution. The investments are expected to start in early 2025.

## *Rationale for REI financing*

Investing in the digitalization of power distribution grids supports the integration of renewable energy sources by optimizing grid operations, facilitating demand response, and improving grid resilience. Digital technologies enable the seamless integration of distributed energy resources, enhance data-driven decision-making, and support regulatory reforms. Such investments are crucial for overcoming barriers to renewable energy integration and accelerating the transition to a low-carbon energy future in line with the goals of the Paris Agreement.

## *Results indicators*

The final list of indicators will be available during the project preparation stage. Anticipated outcomes of the project include the following:

|  |
| --- |
| 1. Greenhouse gas (GHG) emissions reduction/avoidance (metric tons/year)
 |
| 1. Installed capacity of variable renewable energy available to the grid (MW)
 |
| 1. Increase in new smart-charging EV stations installed (#)
 |
| 1. Financing mobilized, including from MDBs and other parties
 |

## *Financing plan, including financial instruments*

The contemplated financing structures will depend on the individual projects and the risks associated with the potential counterparties. EBRD and IFC are currently exploring transactions that require debt and equity and may need to offer other financial instruments as new opportunities emerge. The final selection of the specific financing structure and terms will be done at the sub-project level and take macroeconomic conditions and sectoral dynamics into account.

**Table 11: Indicative Financing Source**

|  |  |
| --- | --- |
| **Sub-Component** | **Indicative Financing Source (US$ million)** |
| **REI** | **EBRD** | **IFC** | **Private Sector** | **Other** | **Total** |
| Battery storage | 30 | 150 | 150 | TBD | TBD | 330 |
| E-Mobility |
| Digitalization |

## *Project preparation timetable*

The detailed timeline for the three sub-components will be developed once the proposed IP program is endorsed by the CTF Committee. It is tentatively expected that implementation of the battery storage, e-mobility, and digitalization projects could start early after approval or in 2025, depending on the licensing and permitting processes, among other factors. EBRD and IFC have already begun engaging with potential clients and expect to be submit projects for CTF Committee approval within timelines consistent with the CIF Pipeline Management and Cancellation Policy.

### ANNEX 10. The Correspondence on the Government’s Final Decision on the Components 1 and 3:

**From:** Yesim Akcollu
**Sent:** Thursday, May 30, 2024 3:17 PM
**To:** Tuba YALIM <tuba.yalim@hmb.gov.tr>; ozgur.turkeri@hmb.gov.tr; Engin Bostancı <ebostanci@enerji.gov.tr>
**Cc:** Tendai Madenyika <tmadenyika@ifc.org>; Frank van der Vleuten <fvandervleuten@worldbank.org>; Megan Meyer <mmeyer1@worldbank.org>; Andrey Shlyakhtenko <ashlyakhtenko@ifc.org>; Sudipta Husain <shusain3@ifc.org>; Fatih Avci <favci@ifc.org>; Stephan Claude Frederic Garnier <sgarnier@worldbank.org>; Ozge Ozden <oozden@worldbank.org>; Debabrata Chattopadhyay <dchattopadhyay@worldbank.org>; 'Seckin Ulgen' <nseckinulgen@gmail.com>; 'Daniel Morris' <dmorris3@worldbank.org>; 'Jimmy Pannett' <jpannett@worldbank.org>; 'Kilic, Sule' <KILICS@ebrd.com>; 'Askin, Muharrem' <ASKINM@ebrd.com>; 'Yasar, Mehmet Erdem' <yasarm@ebrd.com>; 'Tezcan, Can' <TEZCANC@ebrd.com>; Byambasuren Chuluunbat <bchuluunbat1@worldbank.org>; Alan David Lee <adlee@worldbank.org>; Simay Duman <sduman@worldbank.org>; Eyup Mermer <emermer@worldbank.org>; Jimmy Pannett <jpannett@cif.org>; Daniel Morris <danielmorris@cif.org>; 'Tuba YALIM' <tuba.yalim@hmb.gov.tr>; 'Engin Bostancı' <ebostanci@enerji.gov.tr>; 'Gozde Ertemir' <gertemir@enerji.gov.tr>; Fatih Avci <favci@ifc.org>; Sudipta Husain <shusain3@ifc.org>; Elif Karakas Oglak <elkarakas@ifc.org>; Eyup Mermer <emermer@worldbank.org>; Buse Ucanlar <bucanlar@worldbank.org>; 'iklim' <iklim@hmb.gov.tr>; 'ManchanS@ebrd.com' <manchans@ebrd.com>; 'Kilic, Sule' <KILICS@ebrd.com>; 'Askin, Muharrem' <ASKINM@ebrd.com>; 'Managadze, David' <ManagadD@ebrd.com>; 'Tezcan, Can' <TEZCANC@ebrd.com>; Carraretto, Cristian <CarrareC@ebrd.com>; 'ManchanS@ebrd.com' <ManchanS@ebrd.com>; Dadivanyan, Tatevik <DADIVANT@ebrd.com>; 'Tastekin, Elif' <TastekiE@ebrd.com>; Calderone, Margherita <CalderoM@ebrd.com>; 'TumerO@ebrd.com' <TumerO@ebrd.com>; 'IroA@ebrd.com' <IroA@ebrd.com>; 'ozgur.turkeri@hmb.gov.tr' <ozgur.turkeri@hmb.gov.tr>; Frank van der Vleuten <fvandervleuten@worldbank.org>; Megan Meyer <mmeyer1@worldbank.org>; Gozde Ertemir <gertemir@enerji.gov.tr>; iklim <iklim@hmb.gov.tr>; ARDA ULUDAG <arda.uludag@hmb.gov.tr>
**Subject:** Turkiye CTF REI IP -- Letter to MoTF / MENR

 Dear Ms.Yalim, Mr.Turkeri and Mr.Bostanci,

 As you are aware, we had a constructive joint mission on May 21, 2024 with regard to the Turkiye Clean Technology Fund (CTF)-Renewable Energy Integration (REI) Investment Plan (IP), with the participation of your team, as well as delegations of Ministry of Energy and Natural Resources (MENR), International Bank for Reconstruction and Development (IBRD), International Finance Corporation (IFC) and European Bank for Reconstruction and Development (EBRD).

 We would like to bring to your attention, for consideration and decision, two questions that were brought up during the mission, as follows:

* Based on the on-going dialogue with the Government in line with its net-zero target by 2053, the proposed Component 3 on Technical Assistance (TA), whose beneficiary will be MENR  is comprised by two subcomponents for initial assessment of two important projects for ensuring the demand/supply system balancing, namely  “Hydropower energy efficiency (2026) (potential WB support of about  US$300 m.)” and “First pumped hydro storage (2028) (potential WB support of WB: US$600m We are proposing to have these initial assessments financed using a small part of CTF loan financing of USD3m (USD1.5m for each task), . These USD3m. would be under a Recipient Executed Small TA project with MENR.  We would like to check if that would be agreeable to use a CTF loan with MENR to support that component. If this is not agreeable, we propose to keep that component and seek any potential additional grant funding.
* During the mission, some MDB partners expressed interest in postponing the IP submission to September 2024 to enable further IP activity scoping along two axes: 1. agreement between TEAIS and EBRD on the list of a possible investment; and 2. further time for EBRD and IFC to scope their activities around storage and e-mobility. The CIF Secretariat confirmed that an additional extension can be requested to the CTF Trust Fund Committee if desired. Kindly confirm the Government’s decision in this regard.

 Should you or your team require any further information, please do not hesitate to contact us.

Sincerely,

Stephan Claude Frederic Garnier

Turkey Infrastructure Program Leader

Europe and Central Asia Region

**From:** Engin Bostancı <ebostanci@enerji.gov.tr>
**Sent:** Tuesday, June 25, 2024 12:37 AM
**To:** Yesim Akcollu <yakcollu@worldbank.org>; Tuba YALIM <tuba.yalim@hmb.gov.tr>; ozgur.turkeri@hmb.gov.tr
**Cc:** Stephan Claude Frederic Garnier <sgarnier@worldbank.org>; Tendai Madenyika <tmadenyika@ifc.org>; Frank van der Vleuten <fvandervleuten@worldbank.org>; Megan Meyer <mmeyer1@worldbank.org>; Andrey Shlyakhtenko <ashlyakhtenko@ifc.org>; Sudipta Husain <shusain3@ifc.org>; Fatih Avci <favci@ifc.org>; Ozge Ozden <oozden@worldbank.org>; Debabrata Chattopadhyay <dchattopadhyay@worldbank.org>; Seckin Ulgen <nseckinulgen@gmail.com>; Daniel Morris <dmorris3@worldbank.org>; Jimmy Pannett <jpannett@worldbank.org>; 'Kilic, Sule' <KILICS@ebrd.com>; 'Askin, Muharrem' <ASKINM@ebrd.com>; 'Yasar, Mehmet Erdem' <yasarm@ebrd.com>; 'Tezcan, Can' <TEZCANC@ebrd.com>; Byambasuren Chuluunbat <bchuluunbat1@worldbank.org>; Alan David Lee <adlee@worldbank.org>; Simay Duman <sduman@worldbank.org>; Eyup Mermer <emermer@worldbank.org>; Jimmy Pannett <jpannett@cif.org>; Daniel Morris <danielmorris@cif.org>; gertemir <gertemir@enerji.gov.tr>; Fatih Avci <favci@ifc.org>; Sudipta Husain <shusain3@ifc.org>; Elif Karakas Oglak <elkarakas@ifc.org>; Eyup Mermer <emermer@worldbank.org>; Buse Ucanlar <bucanlar@worldbank.org>; iklim <iklim@hmb.gov.tr>; ManchanS@ebrd.com; 'Kilic, Sule' <KILICS@ebrd.com>; 'Askin, Muharrem' <ASKINM@ebrd.com>; Managadze, David <ManagadD@ebrd.com>; 'Tezcan, Can' <TEZCANC@ebrd.com>; Carraretto, Cristian <CarrareC@ebrd.com>; ManchanS@ebrd.com; Dadivanyan, Tatevik <DADIVANT@ebrd.com>; Tastekin, Elif <TastekiE@ebrd.com>; Calderone, Margherita <CalderoM@ebrd.com>; TumerO@ebrd.com; IroA@ebrd.com; Frank van der Vleuten <fvandervleuten@worldbank.org>; Megan Meyer <mmeyer1@worldbank.org>; gertemir <gertemir@enerji.gov.tr>; iklim <iklim@hmb.gov.tr>; arda.uludag <arda.uludag@hmb.gov.tr>
**Subject:** Ynt: GENTLE REMINDER --- RE: Turkiye CTF REI IP -- Letter to MoTF / MENR

Dear Yeşim Hanım,

Thank you for your e-mail and your wishes. Likewise, we hope everything is fine on your end as well.

Regarding the proposed Component-3 of the Draft Investment Plan, it is important to note that MENR or EMRA currently have no intention to receive loans for any project, including technical assessment projects for the rehabilitation of HPPs or the development of PHES. Additionally, EUAS, the publicly owned generation company, did not include PHES initiatives in its current investment plan. Furthermore, EUAS has concerns on a US$ 300 million HPP rehabilitation project due to its potential impacts on supply security. That's why we consider these two investment areas still needing further discussion with EUAS's and MENR's higher management. However, we still agree on maintaining the Component-3 to be funded by potential additional grant funding, as this may be the only acceptable method for MENR to finance technical assessment projects aimed at enhancing future investments in these areas.

Kind regards,

**Engin BOSTANCI**

**Head of Department**

Republic of Türkiye – Ministry of Energy and Natural Resources

Directorate-General of Foreign Relations

Department of Foreign Investment Coordination

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**Sent:** Tuesday, June 25, 2024 6:20 PM
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**Subject:** RE: GENTLE REMINDER --- RE: Turkiye CTF REI IP -- Letter to MoTF / MENR

Dear Mr. Garnier and Mrs. Akcollu,

In your previous e-mail below, you stated the interest of some MDB partners to postpone Türkiye’s REI IP in order to have an agreement between TEİAŞ and EBRD on the list of a possible investment.

Considering the risk of not being able to benefit from the loans and grants to be disbursed under the REI IP, we sent our letter to the CIF Secretariat regarding the submission of the IP until mid-July.

At this stage, we decided that it would be appropriate for TEİAŞ to continue with the World Bank and to proceed the amounts initially agreed in the component 1 for TEİAŞ (US$40 million).

Therefore, as you mentioned in our meeting on June 11, 2024, it is essential that the World Bank, as the lead MDB, immediately maintain coordination for the submission of the IP until mid-July so that the REI IP of our country can be endorsed at the next CIF meeting.

In addition, we kindly request from you to send us the final version of the updated IP on the basis of the recent comments.

Best regards,

Tuba, **Tuba YALIM**

*Head of Department*

**Republic of Türkiye-Ministry of Treasury and Finance**

*Directorate General of Foreign Economic Relations*

*Department of EU, Climate Change and International Organizations,* Tel: +90 312 497 70 88

### ANNEX 11: CIF Integrated Results Framework Toolkit- Renewable Energy Integration Program

|  |
| --- |
| **CIF INTEGRATED RESULTS FRAMEWORK – RENEWABLE ENERGY INTEGRATION PROGRAM** |
| **CIF IMPACTAccelerated transformational change toward net-zero emissions and inclusive, climate-resilient development pathways** |

| **RESULT STATEMENT** | **MONITORING APPROACH** | **EVALUATION AND LEARNING APPROACH** |
| --- | --- | --- |
| **INDICATORS** | **BASELINE** | **MEANS OF VERIFI-CATION** | **TARGET (DATE)** | **NOTES AND SDG ALIGNMENT** | **KEY AREAS** |
| **CIF-LEVEL IMPACTS** |
| Accelerated transformational change toward net-zero emissions and inclusive, climate-resilient development pathways | **CIF 1. Mitigation:** GHG emissions reduced or avoided(mt CO2 eq) | TBD(with reference scenario established) | Annual and lifetime reporting by projects and/or countries |  | This is a CIF impact-level indicator that must be reported as an annual and lifetime estimate of each investment. Core indicator 1 below will feed this indicator for REI.Disaggregation: Direct vs. indirect reduction of GHG emissions, based on an approved methodology per MDBProjects are encouraged to estimate GHG emissions reductions using a “whole of energy system” baseline analysis, which would differentiate between new renewable energy generation from REI investments and the catalytic effects of other investments (energy storage, grid management technologies, grid interconnections) on annual production cycles, as compared to the approved reference scenario, i.e., counterfactual. | **Transformational Change:** CIF aims to drive transformational change[[50]](#footnote-51) across all funded programs and activities. Broadly defined, transformational change is a deep and fundamental change in a system’s form, function, or processes. In the context of the climate crisis, this refers to the many profound, rapid changes in social, economic, and technical systems needed to achieve net zero greenhouse gas emissions, increase social inclusion, manage distributional impacts, enhance resilience and adaptation to climate change, and reduce stress on finite natural systems.**Signals** of transformational change will be assessed through both evaluative and learning-based approaches across **dimensions.[[51]](#footnote-52)** Unlike indicators, signals mark multiple levels of complex systems dynamics based on mixed-methods data collection and analysis of CIF contributions toward transformational change in-situ. As these signals are highly context-specific, they will be proposed, defined, tracked, and reported on according to each IP’s unique context analysis and theory of change, and using a range of methodological approaches. Disaggregated data collection to capture impacts on women, youth, migrants, Indigenous Peoples, and local communities, as well as persons with disabilities is encouraged. Ongoing learning and adaptive approaches, including the identification and tracking of new and emerging signals as programs and contexts evolve, is also encouraged.**This impact area will be measured through CIF-driven evaluation and learning activities, which will not be the direct responsibility of MDBs for annual reporting.****Gender-Transformative Impacts:** The CIF Gender Program outlines (i) improved asset position, (ii) voice, and (iii) resilient livelihoods of women through gender-responsive institutions and markets as its key impact objective. These aspects are to be assessed through evaluative and learning-based approaches, as relevant to the REI program, and in combination with other monitoring data.Areas for further analysis include mechanisms through which women and their organizations are represented in decision-making on renewable energy generation; share of women working in the energy sector; and the impact of off-grid access on women’s labor/time use.**New and additional climate finance mobilized:** Beyond the immediate co-financing CIF leverages, CIF aims to plays a role as a market catalyst by contributing to the creation of markets and driving non-concessional financing through replication of CIF investments, technologies and innovations, regulatory improvements, and other areas. Evaluation and/or learning approaches may be employed to better understand CIF’s contributing role in market systems transformation and volumes of follow-on green financing in CIF-supported markets. Data might also be sourced through national/local market reports and other third-party data aggregators (e.g., IRENA, BNEF, etc.) |
| **CIF 2. Co-Finance:** Volume of co-finance leveraged (USD)  | TBD | TBD |  | Total non-CIF resources leveraged in REI projects. Core indicator 6 below will feed this indicator for REI.Disaggregation: Source of co-financing (MDB, Government, Private Sector, Bilateral, and Other) |

|  |
| --- |
| **REI PROGRAM THEORY OF CHANGE:****If CIF improves market design and system operations, provides enabling technologies and infrastructure, and develops new business models, countries will increase renewable energy penetration in their energy mix, achieve a more flexible and decentralized energy system, improve policies and capabilities, mobilize capital, increase renewable energy access, reduce systems costs, and foster renewable energy innovation, which will all contribute toward CIF’s transformative impact.** |

| **RESULT STATEMENT** | **MONITORING APPROACH** | **EVALUATION AND LEARNING APPROACH** |
| --- | --- | --- |
| **INDICATORS** | **BASELINE** | **MEANS OF VERIFI-CATION** | **TARGET (DATE)** | **NOTES** | **KEY AREAS** |
| **REI PROGRAM-LEVEL IMPACTS** |
| Flexibility of energy systems for smooth integration of higher shares of variable renewable energy generation  | Share of renewable energy generation in supported countries’ grid-connected energy systems (%) | Country-level analyses from IPs and project appraisals (non-zero) | National statistics, macro-level indicators, World Bank (or other MDB) country data |  | Program-level impacts focus on alignment with NDCs and related climate policy mechanisms, national and sectoral development priorities, and available statistics at the Investment Plan and/or country level.This aspect of monitoring and reporting is country-driven and will be tailored to the needs, demands, and interests of each CIF recipient country.**MDBs will not be responsible for program-level impact reporting. All core indicators are situated at the CIF program outcome level.** | **Signals of transformational change:** Signals of transformational change at the program level will focus on more narrowly bounded aspects of energy systems transformation than in the section above (i.e., CIF-level impact). They might cover dimensions of systems transformation that are more closely tied to individual REI recipient countries, Investment Plans and/or project-level impacts. Specific definitions and methodologies are to be determined. |
| **REI PROGRAM-LEVEL OUTCOMES** |
| A. Increased penetration of variable renewable energy into power systems and maximized renewable energy potential of countries | **REI CORE 1****(= CIF 1). Mitigation:** GHG emissions reduced or avoided(t CO2 eq) – direct/indirect | 0(with reference scenario established) | Annual and lifetime estimates by projects |  | This indicator feeds into **CIF Impact 1 (Mitigation)** and should be reported as direct vs. indirect reductions (per MDB-approved methodologies) with evidence provided. | **MDBs are encouraged to undertake** **“whole of energy systems”** **analyses** as baselines during the Investment Plans and project appraisal process and to fully incorporate monitoring, evaluation, and learning aspects into such analyses. Integrated, energy systems-levels analyses can be used to build a theoretical model and reference scenario for how specific renewable energy grid and off-grid integration interventions will affect multiple results areas: renewable energy installation and grid interconnection, annual production, GHG emissions reductions, and changes in energy access. Both estimated and real operational data can also then be consolidated effectively to report across these multiple indicators. Additional guidance on whole of energy systems analyses will follow separately from this IRF.**CIF’s targeted evaluations and/or sector studies to fill strategic knowledge gaps:** Moving down the results chain, the monitoring function becomes increasingly important to capture program outcomes and outputs, whereas the evaluation and learning function will complement core indicators by filling strategic knowledge gaps. Evaluation and learning activities will be selected based on overall stakeholder demand, evidence gaps, and cross-learning opportunities. |
| **REI CORE 2. Installed Capacity:** Installed capacity of variable renewable energy available to the grid (MW) – direct/indirect | 0 | MDB project results data |  | Estimated capacity from renewables (e.g., solar and wind energy) installed, operationalized, and integrated into power grids each year (or commissioned off-grid) as a result of REI interventions.Disaggregation: Renewable energy type (solar, wind, hydro, geothermal, etc.)Direct vs. indirect capacity (MDB-approved methodology) |
| **REI CORE 3. Renewable Energy Production:** Annual renewable energy output (MWh) | 0 | MDB project results/ utilities data |  | Measured by applying the methodology used for REI CORE 2 in combination with annual production dataDisaggregation: Renewable energy type (solar, wind, hydro, geothermal, etc.)Direct vs. indirect production (MDB-approved methodology)Grid-connected vs. off-grid/distributed energy supply |
| **REI CORE 4. Grid Services:** Increase in available grid services and improvements (#)  | TBD | MDB project results/ utilities data |  | Disaggregation: Type, volume, and assets (as established by each MDB) |
| B. Mobilized public and private capital | **REI CORE 5(= CIF 4).Co-Finance:** Volume of co-finance leveraged (USD) | 0 | MDB project financial data |  | Total of non-CIF resources leveraged in REI projects. Reporting on this indicator feeds directly into **CIF Impact 4 (Co-Finance)**.Disaggregation: Source of co-financing (MDB, Government, Private Sector, Bilateral, and Other) |  |
| **REI PROGRAM-LEVEL CO-BENEFITS** |
| Social and Economic Development Co-Benefits | **CO-BENEFIT 1.****Employment and****Livelihoods:** Jobscreated – directand indirect | 0 | MDB project results data / CIF modeling |  | **MDBs will only need to report on one co-benefit indicator per REI project and can select among a range of options or propose another relevant co-benefit.**Disaggregation: Direct vs. indirectBy gender (mandatory) and vulnerable groupsBy type of job | **Quality and distribution of jobs:** Through both just transition and gender-responsive approaches, further evaluative and learning-oriented analyses may center on the types of jobs created (and lost), and which sub-populations are gaining (and losing) employment opportunities. For example, this might include generating evidence on decent jobs created and plans for addressing jobs lost through skills development and economic diversification activities. Alternatively, it might include analyses of women’s access to medium- and high-skilled green jobs, STEM-education and vocational training, and school-to-work transitions.**Modeling:** Indirect job creation, such as induced employment along the supply chain, may be estimated using modeling techniques alongside projects’ reporting of direct job creation. |
| **CO-BENEFIT 2. Policy and Planning:** Coherence across sectors | N/A | N/A |  | N/A | Approaches may consider the degree of alignment between NDCs, national policy, and REI Investment Plans.They may further consider the extent to which other sectors have been consulted during the development of the REI Investment Plans. |
| **REI PROGRAM-LEVEL OUTPUTS** |  |
| A. Improved market design and systems | OPTIONAL (REI Optional Output 8): Number of policies, regulations, codes, or standards supportedto enhance the enabling environment for renewable energy uptake (#) | 0 | MDB project results / country data |  | Designed to address policy or regulatory barriers to renewable energy uptake and subsequent actions taken by local/national governments to increase future investments in renewable energy.This indicator includes all policies supported, whether they are adopted (REI CORE 5) or not. | **Specific evaluation and learning** activities may support output-level learning and assessment. Monitoring data from the output level may also feed into the evidence base for transformational change signals and other higher-level analyses related to REI.**Gender trainings:** While CIF will not track all types of trainings directly, projects are encouraged to also measure trainings designed to address gender considerations, such as women’s awareness of productive use applications and trainings focused on providing women green skills that enable them to access medium and high-skilled green jobs. |
| OPTIONAL (REI Optional Output 9): Number of technical/financial analyses completed to enhance the enabling environment for RE uptake (#) | 0 | MDB project results/ operations data |  | This includes sectoral or market modelling, analyses, pricing methodologies, country diagnostics, studies, net billing schemes, poverty and social impact assessments (looking at accessibility, affordability and targeting of subsidies) and related technical assistance deliverables used to inform policy, regulatory change, and/or investment designs. |
| OPTIONAL- (REI Optional Output 10) Number of persons trained on issues related to renewable energy markets and systems (#) | 0 | MDB project results data |  | This indicator will feed into CIF 3 (total number of beneficiaries) where relevant.Disaggregation: By gender |
| B. Deployment of energy storage systems | **GESP 1. Energy Rating:** Energy rating (MWh) of storage systems installed | 0 | MDB project results data/ technical specifications |  | **This indicator corresponds to GESP-Specific Indicator 1 in the GESP M&R System and should only be reported by REI projects with energy storage components.**Disaggregation: By type of technology (i.e., thermal, mechanical, electrochemical)By location on the energy value chain (generation, transmission, distribution, stationary end use, mobile end use)Distributed storage vs. utility-scale applications |  |
| **GESP 2.****Power Rating:** Power rating (MW) of storage systems installed | 0 | MDB project results data/ technical specifications |  | **This indicator corresponds to GESP-Specific Indicator 2 in the GESP M&R System and should only be reported by REI projects with energy storage components.**Disaggregation: should follow the format of the above indicator. |

1. World Bank Group Country Partnership Framework for The Republic of Türkiye for the Period FY24-FY28 discussed by the Board of Executive Directors on April 9, 2024. [↑](#footnote-ref-2)
2. Türkiye’s investment structure has transformed in favor of productive areas over the years. The share of machinery and equipment investments increased from 39.7% in 2010 to 46.8% in 2023. [↑](#footnote-ref-3)
3. https://www.sbb.gov.tr/wp-content/uploads/2023/03/Turkiye-Recovery-and-Reconstruction-Assessment.pdf [↑](#footnote-ref-4)
4. European Bank for Reconstruction and Development (EBRD), Country Diagnostic, April 2019, https://www.ebrd.com/documents/policy/country-diagnostic-paper-Türkiye.pdf. [↑](#footnote-ref-5)
5. European Commission, Türkiye 2020 Report, https://neighbourhood-enlargement.ec.europa.eu/system/files/2020-10/Turkiye\_report\_2020.pdf. [↑](#footnote-ref-6)
6. OECD, SME Policy Index: Western Balkans and Türkiye, 2022. [↑](#footnote-ref-7)
7. Country Partnership Framework (CPF) of the Republic of Türkiye for the period FY24-FY28 approved by the World Bank’s Executive Directors’ Board as of April 9, 2024 [↑](#footnote-ref-8)
8. Energy combines electricity and heat production, petroleum refining, and fugitive emissions from fuels. [↑](#footnote-ref-9)
9. In 2021, fossil fuels accounted for 84% of Türkiye’s total energy supply, with natural gas comprising 31% of total supply, followed by oil (27%), and coal (25%). Despite considerable growth over the past decade, energy supply from wind, solar and other renewable energy sources only accounted for 16% of total energy supply in 2021. [↑](#footnote-ref-10)
10. https://ticaret.gov.tr/data/60f1200013b876eb28421b23/MUTABAKAT%20YE%C5%9E%C4%B0L.pdf. [↑](#footnote-ref-11)
11. TEIAS 2023 Monthly Electricity Generation and Consumption Reports [↑](#footnote-ref-12)
12. <https://www.sbb.gov.tr/wp-content/uploads/2023/09/Orta-Vadeli-Program_2024-2026.pdf> [↑](#footnote-ref-13)
13. Energy Efficiency 2030 Strategy and II. National Energy Efficiency Action Plan (2024 - 2030) [↑](#footnote-ref-14)
14. TUIK Greenhouse Gas Statistics 1990 – 2021 [↑](#footnote-ref-15)
15. Circular numbered 2021/15, issued in the Official Gazette dated July 16, 2021 [↑](#footnote-ref-16)
16. The National Energy Efficiency Action Plan prepared by the MENR. [↑](#footnote-ref-17)
17. Issued in Official Gazette on January 8, 2011 [↑](#footnote-ref-18)
18. With Law no 7257, issued in the Official Gazette dated November 25, 2020 [↑](#footnote-ref-19)
19. Presidential Decision no. 7189, dated April 30, 2023 [↑](#footnote-ref-20)
20. EPIAS website February 6, 2024 [↑](#footnote-ref-21)
21. EML no: 6446, Article 7/10 [↑](#footnote-ref-22)
22. Issued on the Official Gazette dated May 9, 2021 [↑](#footnote-ref-23)
23. EML Article 7/10 dated July 1, 2022 [↑](#footnote-ref-24)
24. EMRA Website, as of the end of January 2024 [↑](#footnote-ref-25)
25. License Regulation Temporary Article 41/2 [↑](#footnote-ref-26)
26. Connection and Use of System Regulation, Article 20 [↑](#footnote-ref-27)
27. Please see Annex 11 for the Government’s final decision on Components 1 and 3, reflected to this IP.

The Government of Türkiye would like to explore any opportunities with regard to adding a Component 3, in case of availability of additional CTF grant financing of US$3 million, as follows:

**Component 3: Technical Assistance (WB: US$900 m. financing, and US$3 m. CTF REI TA grant financing)**

**A) First pumped hydro storage (2028) (WB: US$600 m. investment, US$1.5 m. CTF-REI TA grant financing):**

The CTF-REI funded TA project will assess the potential sites for pumped hydro storage facilities with regard to associated costs and risks (e.g. environmental, social, financial, hydraulic) risks; and inform the government on the best 3-4 sites. The feasibility study of the best option will be conducted under the $600 m. WB financed investment project.

**B) Hydropower energy efficiency (2026) (WB: US$300 m., US$1.5 m. CTF-REI TA grant financing)**

The World Bank has conducted analyses with regard to necessary energy efficiency measures for the 22 EUAS owned hydro-power plants through the EU-IPA funds. The proposed TA project will help the government sequence the rehabilitation activities without jeopardizing the security of power supply. The prioritized rehabilitation activities will be conducted under the $300 m. WB financed investment project. [↑](#footnote-ref-28)
28. As per usual EBRD practice, the Bank will seek co-financing from private sector as well as other sources. [↑](#footnote-ref-29)
29. In case of availability of additional CTF grant financing of US$3 million., the Government of Türkiye would like to use it for Component 3. [↑](#footnote-ref-30)
30. CIF 2023 “Renewable Energy Integration (REI) Program Monitoring and Reporting (M&R) Toolkit: Operational Guidance on the REI M&R System” <https://www.cif.org/knowledge-documents/rei-program-monitoring-and-reporting-toolkit> [↑](#footnote-ref-31)
31. The toolkit categorizes indicators in the following seven categories:

1) CIF Impact.

2) REI Country Impact Indicators.

3) REI Core Indicators (outcomes).

4) REI Co-Benefits (outcomes).

5) Optional Indicators (outcomes and/or outputs).

6) Project-specific indicators (outcomes and/or outputs); and

7) Energy storage indicators (outcomes). [↑](#footnote-ref-32)
32. The Ministry of Environment, Urbanization and Climate Change Climate (2024) Climate Change Mitigation Strategy and Action Plan (2024-2030) <https://iklim.gov.tr/db/turkce/icerikler/files/undp_azaltim_spread.pdf> is consistent with and reflects Türkiye’s 2023 National Energy Plan. [↑](#footnote-ref-33)
33. Türkiye does not currently have a target for aggregate energy rating of battery storage. The 2023 National Energy Plan assumes an average energy capacity of two hours for battery systems associated with the power rating target. [↑](#footnote-ref-34)
34. The emissions intensity target is defined as 20 percent reduction from 2024 level, the absolute equivalent of which will be determined *ex post*. The 2020 and 2030 values shown in the table are “Electricity Generation Emission Factors” representing the total amount of carbon dioxide emitted per unit of gross electricity generation from power plants in Türkiye using IEA methodology <https://iea.blob.core.windows.net/assets/bf862218-7fd8-4637-aca6-5a347b6ca4f1/IEA_Methodology_Emission_Factors_2023.pdf>. [↑](#footnote-ref-35)
35. Core indicators may be excluded where justifiably irrelevant to a given project’s context (REI 2023 page 23). [↑](#footnote-ref-36)
36. In the 2010-2023 period, investments grew by 6.8 percent on average, while machinery and equipment investments and construction investments grew by 9.4 percent and 3.9 percent, respectively. Meanwhile, machinery and equipment investments have been growing uninterruptedly for the last 17 quarters. [↑](#footnote-ref-37)
37. According to TURKSTAT data, the amount of $7.7 billion can be achieved with the sum of chapter 72 (iron and steel=$2.84 billion) and chapter 73 (articles of iron and steel=$4.82 billion). Accordingly, in 2023 40.5 percent of Türkiye’s exports in these chapters were absorbed by the EU. So, emphasizing “articles” is needed in the sentence. Please note that following this sentence 59% refers only to “aluminum sector” not including “articles” [↑](#footnote-ref-38)
38. Although the tourism is one of the most being impacted sectors by climate change, there are some remarkable efforts to mitigate these effects. Additionally, tailored promotional and marketing activities continue to improve tourism diversification alongside the implementation of sustainable tourism program, having been practiced since 2022. In addition to these efforts, within the scope of the “Climate Change Adaptation Strategy and Action Plan (2024-2030)”, published in March 2024, there are some specific actions to overcome the effects of climate change on the tourism.. [↑](#footnote-ref-39)
39. <https://iklim.gov.tr/db/turkce/icerikler/files/%C4%B0klim%20De%C4%9Fi%C5%9Fikli%C4%9Fine%20Uyum%20Stratejisi%20ve%20Eylem%20Plan_%202024-2030.pdf> [↑](#footnote-ref-40)
40. The Regulation on Unlicensed Electricity Generation in Electricity Market Issued in 2011 [↑](#footnote-ref-41)
41. In the unit dedication method, the generation facility is isolated from the national grid and operated as a generation facility of the neighboring country. [↑](#footnote-ref-42)
42. EMRA Board Decision no: 12295, dated December 28, 2023 [↑](#footnote-ref-43)
43. Last resort tariff is determined as the average market price plus a profit component for the last resort supplier [↑](#footnote-ref-44)
44. EMRA Board Decision no: 12158, dated October 26, 2023 [↑](#footnote-ref-45)
45. New EML, Article 14 [↑](#footnote-ref-46)
46. The capacity was increased to 5 MW by Presidential Decree dated May 9, 2019 number 1044, while in the new EML, it was determined as 1 MW, and the president was given the authority to increase it up to 5 times. [↑](#footnote-ref-47)
47. https://www.ilo.org/ankara/news/WCMS\_849762/lang--en/index.htm#:~:text=the%20Turkish%20...-,Going%20green%20could%20create%20300%2C000%20new%20jobs%20for%20the%20Turkish,fuels%20to%20renewable%20energy%20sources. [↑](#footnote-ref-48)
48. In line with the REI Core Indicator 1, i.e. reduction in CO2 emissions. The project will provide grid connection to new WPPs and solar power plants (SPPS), and these wind and solar power plants will not be developed without the necessary investment in transmission infrastructure under the project, in which case gas-fired generating plants would likely be built to meet the increasing local demand for electricity. The project will therefore contribute to the reduction in carbon emissions from gas-based electricity generation. [↑](#footnote-ref-49)
49. [↑](#footnote-ref-50)
50. Transformational change is defined as “fundamental change in systems relevant to climate action with large-scale positive impacts that shift and accelerate the trajectory of progress towards climate neutral, inclusive, resilient, and sustainable development pathways (Transformational Change Concepts, May 2021, <https://www.climateinvestmentfunds.org/sites/cif_enc/files/knowledge-documents/tclp_workshop_updated_tc_concepts_may2021.pdf>). [↑](#footnote-ref-51)
51. The five dimensions of transformational change include relevance, systemic change, scale, speed, and adaptive sustainability. Signals – which can be advanced or emerging – offer an alternative conceptual framework for recognizing and capturing transformational change through the programmatic lifecycle (<https://www.climateinvestmentfunds.org/sites/cif_enc/files/knowledge-documents/tclp_workshop_signalsenergy_framework_may2021.pdf>) [↑](#footnote-ref-52)