EGYPT OIL&GAS RESEARCH & ANALYSIS

Towards Efficient Energy Use in Egypt

Policies, Technologies, and Pathways

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Policies, Technologies, and Pathways

By Nermeen Kamal & Abdullah Mostafa

Energy efficiency is called the first fuel in clean energy transitions, as it provides some of the quickest and most cost-effective CO_2 mitigation options while lowering energy bills and strengthening energy security.

Egypt's pursuit of energy efficiency is anchored in the Integrated Sustainable Energy Strategy 2035 (ISES 2035), which targets an 18% reduction in national energy demand by 2035. Achieving this target depends on modernizing power generation and transmission infrastructure and deploying advanced technologies.

Policy momentum is evident through the ongoing preparation of the third National Energy Efficiency Action Plan and the petroleum sector's dedicated 2022–2035 strategy aimed at large energy consumers.

Institutional frameworks are also evolving, with specialized energy efficiency units being established across ministries and a digital monitoring system under development to track performance at the sector level. Yet, substantial untapped potential remains—particularly in transportation, where minimum fuel efficiency standards and vehicle rating systems could drive notable gains, and in the residential sector, where stricter efficiency standards could unlock further savings.

This report provides an assessment of Egypt's energy consumption landscape and production patterns alongside fuel utilization during the first nine months of fiscal years (FYs) from 2020/21 to FY 2024/25. It further outlines major efficiency initiatives and technologies, evaluates industrial efficiency programs, and explores financing mechanisms available to advance energy efficiency improvements.

Trends in Egypt's Energy Landscape

Egypt's performance in global energy efficiency benchmarks demonstrates both progress and remaining challenges. In 2025, the country ranked 20th in the Climate Change Performance Index (CCPI), which assesses mitigation efforts across four categories: GHG emissions, renewable energy, energy use, and climate policy—with energy use accounting for 20% of the index weight.

This marks an improvement from 22nd place in 2024, reflecting efficiency gains.

Similarly, Egypt ranked 74th in the 2025 Energy Transition Index (ETI), which evaluates both current energy system performance and the readiness of the enabling environment, up from 75th the year before.

Egypt in Some Global Rankings in 2025

	CCPI	ETI
RANK	20	74
SCOPE	67	118

Fossil Fuel Dynamics

Egypt's total fossil fuel production during the first nine months of FY 2024/25 contracted by approximately 20.8% compared to FY 2020/21; a decline largely driven by a sharp 30.6% drop in natural gas output. This decline accelerated after FY 2021/22.

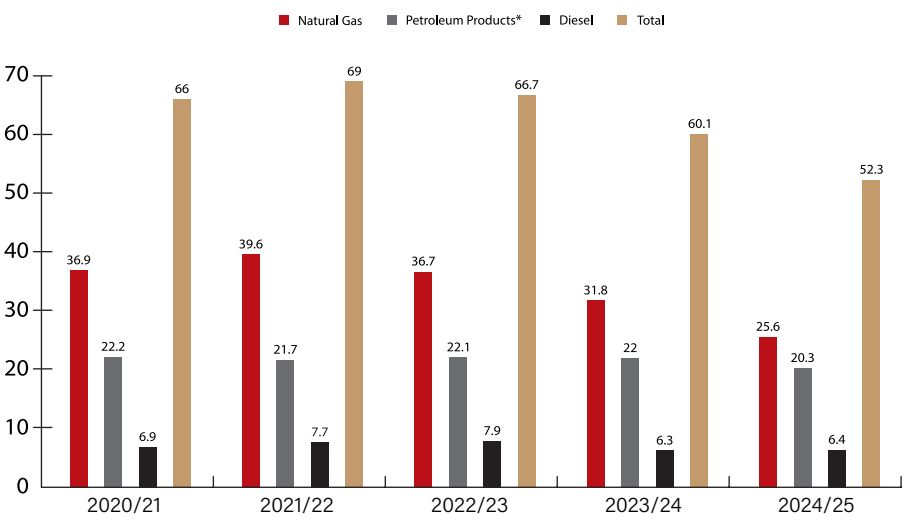
This downturn aligns with emerging challenges at the Zohr field, Egypt's largest offshore natural gas field, which began encountering reservoir pressure depletion, water infiltration, and well shutdowns in 2022. As a result, natural gas' share of total hydrocarbon production fell from 55.9% in FY 2020/21 to 49% in FY 2024/25, according to the Central Agency for Public Mobilization and Statistics (CAPMAS).

On the other hand, petroleum products experienced a milder contraction of 8.6% over the same five-year period, while diesel production exhibited more fluctuations.

The decline in petroleum output is primarily driven by the natural depletion of aging oil fields, coupled with reduced exploration and production activity due to the buildup of the International Oil Companies' (IOCs) arrears.

In response, the Ministry of Petroleum and Mineral Resources (MoPMR) has introduced a comprehensive strategy built on six pillars. A key pillar of this framework is increasing domestic production by extracting maximum value from mature fields. Another vital pillar emphasizes creating a more attractive investment climate—through measures such as settling outstanding IOC arrears on clear schedules, ensuring timely payments to partners, and reinforcing commitments to safety, energy efficiency, and emissions reduction—to restore and strengthen investor confidence, according to the MoPMR.

Hydrocarbons Production in the First Nine Months (mmt)



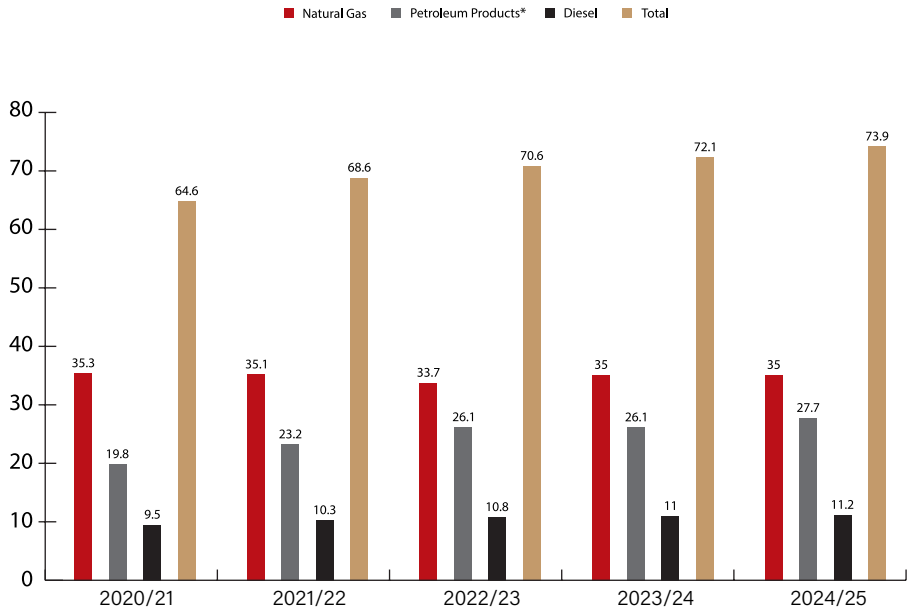
*Including crude oil, condensates & butane

Source: CAPMAS' Monthly Informatics Bulletin

During the first nine months of FY 2024/25, Egypt's fossil fuel consumption marked a 14% increase compared to the same period of FY 2020/21. The growth was primarily driven by higher demand for petroleum products, which expanded by 40% over the five years. Similarly, diesel consumption increased by 18%, reflecting the growing reliance on liquid fuels to meet domestic needs, according to CAPMAS.

By contrast, natural gas consumption remained broadly stable, with only a marginal decline of 0.8% over the five fiscal years. This stability highlights natural gas's entrenched role in the fuel mix, maintaining its position as the largest single fuel source, although its share of total fossil fuel consumption declined from 54.6% in FY 2020/21 to 47% in FY 2024/25 due to the faster rise in petroleum-based fuels, according to CAPMAS.

Hydrocarbons Consumption in the First Nine Months (mmt)

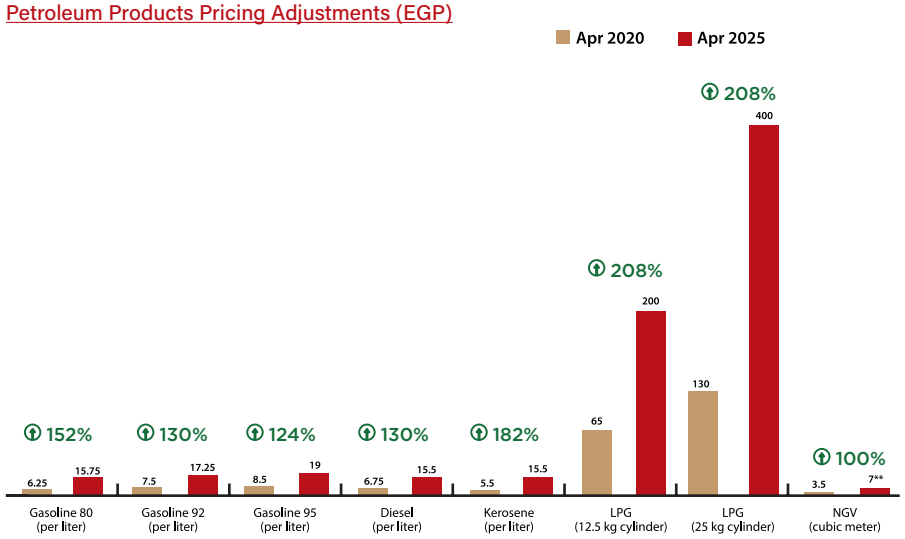


*Including crude oil, condensates & butane
Source: CAPMAS' Monthly Informatics Bulletin

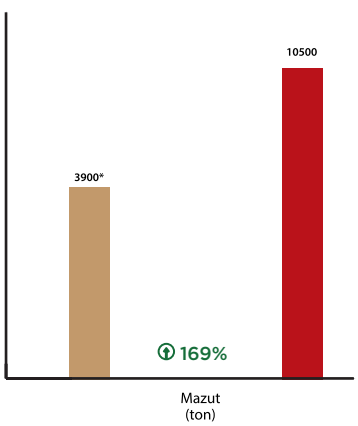
Egypt has been implementing a gradual program to reduce petroleum product subsidies by increasing prices as part of its efforts to enhance energy efficiency and ease the burden on the state budget. The International Energy Agency (IEA) affirms that broad fossil fuel subsidies lead to excessive energy consumption and limit investments in efficiency and clean energy. Similarly, the International Monetary Fund (IMF) notes that fuel subsidies diminish economic incentives to adopt energy-saving technologies, hinder sustainable growth, and increase fiscal pressures.

Accordingly, Egypt's approach to restructuring the subsidy system—by aligning petroleum product prices more closely with global levels—come in line with the recommendations of these international institutions, as reducing subsidies contributes to more rational consumption and encourages investments in more energy-efficient sectors.

Petroleum Products Pricing Adjustments (EGP)



** October 2024



* October 2020

Renewable Energy Generation Expansion

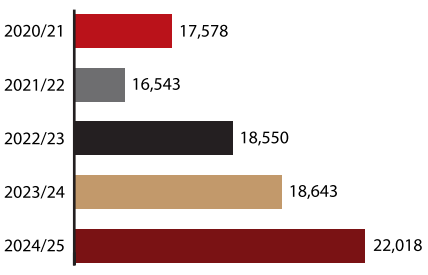
Egypt's renewable sources output expanded by nearly 25% over the last five fiscal years. Hydropower remained the backbone of the mix, consistently supplying about 53% of the total renewable generation in the first nine months of FY 2024/25. Its growth was around 12.7% across the five years, as highlighted in the New and Renewable Energy Authority (NREA) reports.

Wind energy displayed the sharpest acceleration, increasing by roughly 51% in the last five years, lifting its share of total output by 25% in the first nine months of FY 2024/25.

Solar PV followed with an output gain of nearly 30%, though its share remained steady at about 19% of the mix in the first nine months of FY 2024/25, according to NREA.

These dynamics underscore Egypt's gradual diversification within renewables. Renewable energy and energy efficiency are complementary strategies for achieving a sustainable energy system in Egypt.

Production in First Nine Months (TWh)



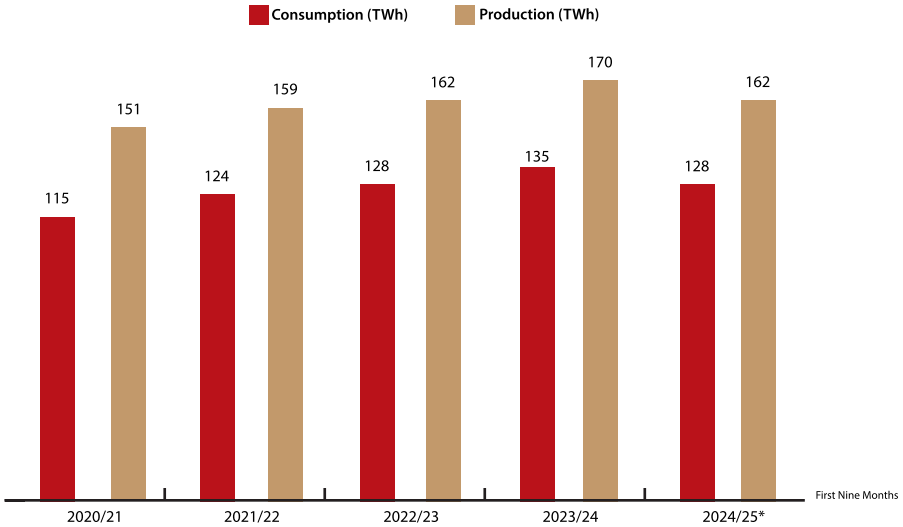
Source: NREA annually and quarterly reports

A significant share of Egypt's fuel mix and a small contribution of renewable energy sources are directed toward power generation. This allocation underscores the country's reliance on conventional fuels to meet growing electricity demand, with natural gas accounting for 57.5% of electricity generation during FY 2023/24, according to the Egyptian Natural Gas Holding Company (EGAS) annual report.

Electricity Production-Consumption Balance

Over the first nine months of the past five years, Egypt's electricity consumption, including local consumption and international electrical interconnections, averaged around 126 terawatt hours (TWh). Production averaged nearly 160 TWh, reflecting a consistent surplus of supply over consumption. Between FY 2020/21 and FY 2024/25, higher consumption was mainly concentrated in the summer months, June, July, and August, according to CAPMAS and the Central Bank of Egypt (CBE).

Electricity Market Trends



The sectoral composition of electricity consumption varied over the first eight months of FY 2024/25 compared to FY 2020/21. Households, while remaining the largest consumer with about 38% in FY 2024/25, increased by about 15.3% during the five FYs. In contrast, commercial consumption registered the fastest expansion, increasing by roughly 58.6% during the five FYs. Meanwhile, the industrial sector represents 26.5% of total consumption in FY 2024/25.

The international interconnections contracted significantly, falling by about 56.6%, underscoring the growing dominance of domestic consumption in Egypt's power balance, according to the CBE.

*First eight months
Source: CBE Real Sector data

National Energy Efficiency Action Plan

Strategic Frameworks

Egypt's current energy efficiency direction is guided by the Integrated Sustainable Energy Strategy 2035 (ISES 2035), which outlines the framework for reducing energy demand and expanding renewable generation as part of Egypt's long-term transition plan.

In parallel, the Petroleum Sector Energy Efficiency Strategy 2022–2035, formally launched by the MoPMR at COP27, sets phased savings targets through 2027 and 2035 and provides a roadmap for applying energy management systems, audits, and technology upgrades, according to the Egyptian Petroleum Sector Energy Efficiency (EE) Strategy 2022-2035.

National Energy Efficiency & Renewable Targets

Petroleum Sector Energy Efficiency Strategy

Strategy	ISES 2035	Government Target	Phase 1	Phase 2
Target	18% Reduction in Total Energy Demand	29.7% of Electricity Generation from Renewables	10% Energy Consumption Saving	18% Energy Consumption Saving
Timeframe	By 2035	By 2030	2022-2027	2025-2035

Regulatory & Legislative Initiatives

Egypt's energy efficiency framework is set under Electricity Law No. 87 of 2015, which mandates the Electricity Regulatory Authority (EgyptERA) to oversee electricity use efficiency through annual plans covering demand management, efficiency improvement, renewable promotion, and awareness raising, according to EgyptERA's Official Website.

Recent Actions to Improve Energy Efficiency & Transition

	Initiative	Actor	Objective
2023	Decree No. 51	Presidential	Allocation of ~26,000 Km^2 Land for Renewable Projects
	Decree No. 415	Government	Established National Measurement, Reporting, and Verification (MRV) System for GHG Emissions
2024	Certification of Origin System	MERE	Enhance Transparency for Renewable Electricity Producers
	Circular Enabling Direct Supply Agreements	EgyptERA	Allow Producers to Sell Directly to End-Users Via Grid
	Annual Loss-Reduction Plans	EEHC	Set Measurable Targets for Distribution Efficiency

Egypt's Alignment with International Energy Efficiency Standards

Enhancing energy efficiency worldwide relies on well-established international standards covering industrial operations, appliances, buildings, and power systems. Egypt has progressively aligned with several of these frameworks through ministerial decrees, regulatory codes, and institutional initiatives.

Beyond domestic initiatives, Egypt's progress in energy efficiency also depends on aligning with international benchmarks. Such alignment ensures compatibility with global markets, facilitates technology transfer, and reinforces investor confidence.

Major Global Energy Efficiency Mechanisms and Egypt's Adoption

International Standard/Mechanism	Scope	Application in Egypt
ISO 50001 – Energy Management Systems	Framework for organizations to manage and improve energy performance	Adopted by leading companies, EGAS was officially certified in 2021
IEC 60034-30-1 (IE Codes) – Electric Motors	Defines efficiency classes for motors (IE1–IE4)	Ministerial Decree No. 463/2020 requires all motors (0.75–375 kW) to comply with ES 2623-3/2017, harmonized with IEC*, mandating a minimum efficiency of IE3
Energy Efficiency Building Codes (EEBCs)	Establish efficiency standards for residential and commercial buildings	Codes were issued in 2005 (residential) and 2009 (commercial) by HBRC** but remain non-mandatory and under review
Grid Codes for Renewable Integration	Technical standards for connecting renewable plants to the grid	EgyptERA issued the Solar PV Grid Connection Code (MV & HV)***
WLTP – Worldwide Harmonized Light Vehicles Test Procedure (UNECE GTR No. 15)	UN global procedure to measure fuel consumption and CO_2 emissions of passenger cars and light-duty vehicles	Egypt has no mandatory adoption of WLTP for vehicle testing

* International Electrotechnical Commission ** Housing and Building National Research Center *** Medium Voltage & High Voltage

To put these international standards into operation at the national level, Egypt has established the Energy Efficiency and Rationalization Unit within the Egyptian Organization for Standardization and Quality (EOS), pursuant to *Ministerial Decree No. 171/2011*. The Unit enforces appliance energy labeling, issues conformity certificates, and verifies energy consumption levels before market entry. It also promotes consumer awareness and monitors compliance, thereby ensuring that efficiency standards are effectively implemented at the national level, according to the EOS official website.

Energy Efficiency Measures & Initiatives

Electricity Sector

During FY 2023/24, the Egyptian Electricity Holding Company (EEHC) implemented a dual-track strategy combining operational upgrades in distribution networks with the deployment of smart meters and high-efficiency transformers. These measures were part of the national loss-reduction program, which sets measurable annual targets approved by EgyptERA to reduce technical and commercial losses in the electricity grid, according to the EEHC Annual Report 2023/24.

Additionally, EEHC initiated in 2024 the Grid Digitalization and Innovation Hub, aimed at establishing a national supervisory system for real-time distribution monitoring and control. This facility is designed to accelerate smart-grid integration and enhance overall network efficiency, according to the EEHC official project announcement.

In July 2025, the Ministry of Electricity and Renewable Energy (MoEE) and the Ministry of Public Business Sector (MPBS) agreed on protocols to boost efficiency in power-intensive plants and to improve operations in heavy factories (steel, petrochemicals, etc.), according to the Egyptian Cabinet Media.

In August 2025, the MoEE launched the 'Guide to Rationalizing and Improving Energy Efficiency in the Industrial Sector,' which provides practical steps for factories to optimize energy use while supporting Egypt's broader climate and sustainability goals, according to the Egyptian Cabinet.

Key Highlights of Industrial Energy Efficiency Guide (2025)

- Support local manufacturing
- Lower costs & electricity bills
- Reduce emissions
- Optimize energy use in factories
- Raise awareness among workers & managers

Oil & Gas Sector

As part of the Petroleum Sector Energy Efficiency Strategy (2022–2035), the MoPMR, in cooperation with the European Bank for Reconstruction and Development (EBRD), has launched several initiatives, including ISO 50001-based energy management systems and a sustainable financing mechanism for efficiency projects. The Ministry also established a Center of Excellence to institutionalize best practices, with the overall goal of reducing consumption and improving operational efficiency, according to MoPMR and the Petroleum Sector EE Strategy 2022–2035.

The MoPMR and affiliated companies implemented several flare-gas recovery projects. They launched collaborations with the World Bank (WB) to reduce fuel losses and enhance efficiency in upstream and midstream operations, according to the MoPMR. In April 2025, the ministry announced completing 340 energy efficiency projects that collectively avoided 1.1 mmt of carbon dioxide emissions per year. In parallel, 100 renewable energy projects with a combined capacity of 21 megawatt (MW) were deployed, while 35 additional flare-gas recovery projects helped prevent nearly 2 mmt of emissions. Methane monitoring campaigns at 60 sites also presented new opportunities for mitigation.

During FY 2024/25, the Egyptian General Petroleum Corporation (EGPC) implemented energy transition projects, of which 18 entered full operation while 20 remain under advanced execution. These projects collectively delivered an annual financial saving of EGP 5.2 billion and prevented nearly 470,000 tons of CO_2 emissions. EGPC advanced renewable projects in the Western Desert and Alexandria through innovative financing, while upgrading its digital platform to monitor the energy transition with geospatial data and standardized reporting, according to the MoPMR press release.

EGPC Energy Transition Outcomes in FY 2024/25

Implemented Projects	Solar Capacity Added	Diesel Reduction	Flare Gas Utilized
38	**30** MW	**68** mml/y	**4.5** bcm/y

Renewable Energy Sector

While energy efficiency typically refers to reducing energy consumption at the end-use level, projects such as battery storage and solar-plus-storage primarily enhance system or grid efficiency. By reducing renewable curtailment, improving asset utilization, and enabling a cleaner energy mix, these projects strengthen overall sustainability and grid resilience.

In February 2025, Egypt signed Capacity Purchase Agreements (CPAs) with AMEA Power to develop the country's first standalone Battery Energy Storage Systems (BESS) with a combined capacity of 1,500 MWh. Unlike storage facilities tied to a specific solar or wind farm, these projects are designed as independent grid-scale stations to support the national electricity system.

The agreements, signed by the Egyptian Electricity Transmission Company (EETC) in the presence of the Minister of Electricity and Renewable Energy, aim to enhance grid stability and facilitate the integration of both wind and solar generation, as reported by AMEA Power's official press release.

Standalone Battery Storage Agreements

BESS Agreement		
Location	**Benban**	**Zafarana**
Capacity (MWh)	**500**	**1000**

Moreover, in July 2025, Egypt commissioned its first utility-scale solar-plus-storage project, integrating a 500 MW solar PV plant with a 300 MWh BESS. This milestone marks a major step toward strengthening grid resilience and accelerating renewable integration, as confirmed by AMEA Power's official press release.

Utility-Scale Solar PV & Battery Storage Project

Location	PV Capacity	Storage Capacity
Aswan	**500** MW	**300** MWh

Access to Financing for Efficiency Upgrades

Access to financing for energy efficiency development in Egypt has become a key driver for achieving the country's sustainability and energy transition goals. In recent years, the government, international development institutions, and private sector partners have introduced green financing mechanisms, loans, and incentive programs to support projects that reduce energy consumption and enhance energy efficiency. These programs aim to bridge financing gaps, attract investment, and encourage industries, businesses, and households to adopt energy efficiency.

Government Financing

Improving the quality and efficiency of services and providing a transparent and fair regulatory environment are priorities in the Electricity and Renewable Energy Sector Action Plan. The MoEE has issued qualification certificates to companies eligible to contract under the P2P system for the production and consumption of electricity. Four solar and wind energy projects with a total capacity of 400 MW and a total investment of $388 million are underway. The company is building the plant and selling the electricity produced directly to industrial consumers, according to the MoEE.

International Partners Support

The energy sector ranked second in total development financing directed to the private sector, supported by key international partners such as the EBRD, the European Investment Bank (EIB), and the German Development Bank (KfW). These institutions played a pivotal role in advancing the energy pillar, with the sector also ranking third in development finance for technical assistance, largely provided by the European Union (EU).

This progress has been fueled by the growing momentum of renewable energy and resource efficiency initiatives, according to the Ministry of Planning, Economic Development, and International Cooperation.

International Finance in the Energy Sector

Share in Total Development Finance for Technical Assistance*

25%

Share in Total Development Finance to the Private Sector *

14.5%**

*From 2020 to mid-2025 **Directed to Energy & Electricity

The United Nations Industrial Development Organization (UNIDO) has advanced Egypt's energy efficiency agenda by supporting industrial energy management programs. Through initiatives such as the Industrial Motors Energy Efficiency Programme, UNIDO, with the Egyptian Environmental Affairs Agency (EEAA), allocated around $3 million of the climate change STAR allocation in 2016 to work with the Ministry of Trade and Industry on developing a program for promoting energy efficiency for industrial motors. The project is 98% complete and is expected to be fully delivered by the end of August 2025, according to UNIDO.

In January 2025, the EBRD invested $100 million in Arab African International Bank (AAIB's) inaugural $500 million sustainability bond, with about 75% of proceeds allocated to green projects, including energy efficiency, renewables, and green buildings.

The EIB provided €271 million in July 2024 to boost industrial energy efficiency, renewable adoption, and environmental standards, which will also help Egyptian companies comply with the EU's Carbon Border Adjustment Mechanism when the carbon tax is imposed from 2026 onwards.

In December 2023, the Ministry of Planning, Economic Development, and International Cooperation signed €76 million in soft financing and grants with the KfW to modernize Cairo's smart grid, expand renewable capacity, and support energy efficiency projects, according to the Ministry of Planning, Economic Development, and International Cooperation and EIB.

Egypt's progress in energy efficiency reflects a coordinated effort across the electricity, petroleum, and renewable energy sectors. Through regulatory reforms, technological innovation, and targeted investments. Initiatives such as loss-reduction programs, flare-gas recovery, and renewable energy hubs are not only enhancing efficiency but also contributing to emissions reduction and climate resilience. To sustain this momentum, Egypt must expand sector-wide programs, strengthen monitoring and evaluation systems, and deepen private-sector participation. By embedding efficiency across industries, accelerating the adoption of smart technologies, and aligning investments with climate objectives, Egypt is well-positioned to advance its energy efficiency agenda.

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