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WORKSHOP: INTERNATIONAL COOPERATION IN EGYPT'S ENERGY SECTOR

APRIL 24, 2024

Cairo, Egypt

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EXECUTIVE SUMMARY

The United States Agency for International Development (USAID) in collaboration with Egypt's Ministry of International Cooperation (MoIC) hosted a workshop on April 24 to discuss international cooperation in the energy sector. This workshop convened over 55 participants from Government of Egypt (GoE) entities and development partners.

The workshop facilitated discussion on four key topics:

- **Large-scale renewable project planning, development and integration.** Participants discussed Egypt's ambitious goals of adding significant amounts of renewable energy (RE) in the coming decade and the new needs and challenges associated with grid planning and expansion, system operations, flexibility, generation procurement approaches and RE supply for hydrogen plants.
- **Regulation and markets for RE grid integration.** Participants discussed key regulatory changes and market needs that can enhance the adoption of clean energy. These included Egypt's legal requirement to transition to a wholesale electricity market as well as needs for new transmission pricing and access arrangements and renewable energy certificates and markets.
- **Cross-cutting themes of gender and inclusion, environmental safeguards and circular economy.** Participants discussed ways that gender and social equality should be considered in the context of Egypt's energy transition, work to ensure environmental practices are implemented in the site preparation and development of RE projects, and broader environmental challenges such as circular economy and end-of-life management for renewable energy and storage equipment.
- **Demand side and distributed technologies including energy efficiency, distributed RE, e-mobility and distribution companies.** Participants discussed barriers to Egypt's ambitious goals of improving end-use energy efficiency, the role of distributed solar photovoltaic (PV) in Egypt's energy transition, early-stage efforts to promote electric vehicles, and the overall role of the distribution sector in integrating RE and adopting these demand-side technologies.

Overall, donors and GoE counterparts found the exchange of ideas and experiences valuable and expressed the desire for the workshop to translate into new concrete actions and collaboration.

WORKSHOP OVERVIEW

On April 24, 2024, the United States Agency for International Development (USAID) in collaboration with Egypt's Ministry of International Cooperation (MoIC) hosted a workshop to discuss areas where technical assistance may help advance Egypt's energy sector goals. USAID has pledged support for the energy pillar of Egypt's Nexus of Water, Food and Energy (NWFE) program and convened stakeholders engaged in the implementation of this effort to facilitate an exchange of information on ongoing donor support and a dialogue on future opportunities for international cooperation.

PARTICIPANTS

The workshop was attended by 55 participants from the following entities:

- Ministry of International Cooperation (MoIC)
- Ministry of Electricity and Renewable Energy (MoERE)
- Ministry of Petroleum and Mineral Resources (MoPMR)
- Egyptian Electric Utility Regulatory Agency (EgyptERA)
- Egyptian Electricity Holding Company (EEHC)
- Egyptian Electricity Transmission Company (EETC)
- African Development Bank (AfDB)
- British Embassy
- Danish Embassy, including Danish Energy Agency
- Development Finance Advisors (DFA)
- Engazaat
- European Bank for Reconstruction and Development (EBRD)
- European Investment Bank (EIB)
- German Embassy, including Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and Kreditanstalt für Wiederaufbau (KfW)
- European Union (EU delegation)
- Japan International Cooperation Agency (JICA)
- World Bank
- United States Embassy, including USAID

WORKSHOP DISCUSSION

Discussion topics built on a broad energy sector assessment completed by USAID in 2023. The assessment identified four technical themes where international partner assistance might support GoE goals:

1. Large-scale renewable project planning and development;
2. Regulation and markets for RE grid integration;
3. Cross-cutting themes: gender and inclusion, environmental safeguards, and circular economy; and
4. Distributed technologies: energy efficiency, distributed RE, e-mobility, and distribution companies.

The workshop kicked off with presentations from key stakeholders, before moving into an open discussion of the technical themes.

KEY PRESENTATIONS

Presentations from key stakeholders provided an overview of key energy sector priorities and goals.

- USAID's Mission Director welcomed participants and expressed excitement on behalf of USAID in supporting Egypt's goal of becoming a regional clean energy hub. He noted that USAID committed \$10 million to support NWFE at the Conference of the Parties (COP) 27 and emphasized that this workshop should be an initial step in an ongoing dialogue leading to concrete actions and collaboration.
- EBRD provided a progress update on the NWFE energy pillar. Progress has been made on decommissioning 5 gigawatts (GW) of natural gas, and over 3 GW of renewable energy projects are under development or construction and expected to be operational by 2027. Technical assistance has been launched around the decommissioning master plan, just transition, green value chains, private to private electricity sales, and grid strengthening.
- The Ministry of Electricity and Renewable Energy presented on energy sector reforms and future priorities. MoERE emphasized the GoE's ambitious goals for renewable energy and energy efficiency, which will likely be increased from current targets (RE to reach 42 percent of installed capacity and EE to reduce energy consumption by 18 percent of the 2035 forecasted business-as-usual energy consumption.) Successes such as the Benban solar park were highlighted, as well as Egypt's previous experience in swiftly bringing new generation capacity online.
- The Ministry of Petroleum highlighted strategic goals around energy security, financial sustainability (monetization of decarbonization), and sector governance. Ongoing efforts include subsidy reform, improving the energy efficiency of generators, methane abatement, and green hydrogen development.
- EgyptERA presented on the key regulations needed to facilitate RE development and attract private sector participation. Key upcoming efforts of EgyptERA will focus on enabling bilateral energy trade across the network, the transition to competitive markets, rules for green certificates, mini-grid regulations, and storage.

LARGE-SCALE RENEWABLE PROJECT PLANNING, DEVELOPMENT, AND INTEGRATION

Egypt has ambitious plans for adding new utility-scale renewable power to the grid, but as noted in USAID's sector assessment, this will require changes in how the system is managed and operated as well as new infrastructure to integrate this new intermittent capacity. The workshop discussed technical support with respect to the following areas:

- **Grid planning and expansion.** Defining the technical requirements and mobilizing the large financial and contracting resources to coordinate the execution of the lines, substations, and other upgrades needed to evacuate the 10 GW of RE identified as part of the NWFE initiative and beyond. Technical assistance could support planning, modeling, analysis related to expanding and modernizing the grid, training and pilots, study tours, and more.

- **System operations.** Modern system operations ensure grid stability with high penetrations of intermittent generation. Technical assistance might be geared toward training system operators, conducting modeling, supporting innovation in system operations, and pilots related to visibility and control, flexibility, storage, and transmission and distribution management.
- **Flexibility.** Grid flexibility and flexibility resources such as reserves need to be identified to scale up renewable energy. Technical assistance could support analysis, modeling, plant testing, and pilots to determine the amount of operating reserves the system requires when plants are commissioned and the best flexible reserves.
- **Auctions.** Compared to negotiated/bilateral procurements, auctions often allow for faster project execution and offer greater volume control and ease in scaling for multiple projects and rounds. Technical assistance could support the design of auctions and their platforms and help Egypt plan for and implement current or future auctions.
- **Securing RE for hydrogen development.** Egypt's ambitious plans to produce green hydrogen require economic provision of clean energy to hydrogen plants. Both physical infrastructure (such as transmission corridors) and market solutions (such as certificates of origin) are likely needed to ensure that clean energy can be supplied a sufficient number of hours each day to make the hydrogen plants economically viable. Technical assistance might support the modeling, technical, and financial analyses of infrastructure investments. It might also be directed toward techno-economic analysis of potential plants, modeling grid impacts of end-uses, and development of a renewable energy market.

DISCUSSION

Egyptian counterparts, including MoERE, EETC, EEHC, and EgyptERA, recognized the challenges in the areas of grid expansion, system operations, and flexibility. They noted the need for additional work to understand and plan for system upgrades, options, and applications of storage; improved generation forecasting and approaches to monitoring the performance of generators over their lifetimes; the impact of generators on the grid both initially and over time; and capacity building in these areas and more broadly.

Many international partners (EBRD, World Bank, EU delegation, the German Federal Ministry for Economic Cooperation and Development (BMZ), AfDB, United Nations Industrial Development Organization (UNIDO), EIB, and the Foundation for Community Development and Empowerment) discussed ongoing activities in support of this technical area. These included support for system planning and least-cost optimization, system modeling and storage strategy, and network reinforcement projects. Other work was discussed that directly facilitates new projects, including environmental impact analyses to ease predevelopment costs, advisory review of power purchase agreements with an eye to mitigating potential risks to the developer, and direct financing of infrastructure investments and project development.

REGULATION AND MARKETS FOR RE GRID INTEGRATION

Egypt has set a course to adopt reforms and market processes designed to encourage private sector participation in the supply of new renewable energy and the energy sector more broadly. For instance, the transition to a competitive wholesale power market has already been mandated by law. Other

policies and regulations that promote transparency and competition can further enable the private sector to provide the desired energy services efficiently, when needed, and at competitive prices. The workshop discussed technical support for the following areas:

- **Transition to wholesale electricity market.** The establishment of a wholesale power market is required by law and aligned with the vision for sector reform that Egypt has initiated. Design of this market will need to consider existing and new generation as well as the specific institutional arrangements and functions best suited to the Egyptian context. Technical assistance could support preliminary market designs, pilots, analysis of commercial accounting, billing and settlement systems, market software, and capacity building of market participants.
- **Renewable energy markets.** Electricity supplied to hydrogen plants will likely come from multiple generation sources to be economic and will need to be traceable to ensure the hydrogen can be considered green. Support could be provided to the development of market mechanisms for trading renewable energy.
- **Transmission access and pricing arrangements.** Fair access to the grid and equitable allocation of stability charges is key to greater participation of private developers and independent power producers. Open access to the grid is also a fundamental condition for the implementation of a power market. Technical assistance could be provided around analyzing and implementing transmission access policies and pricing mechanisms. Support might also go toward developing grid codes, protocols, and pricing mechanisms for reserves, ancillary services, and other grid stability services needed in the context of both higher-penetration renewables and a wholesale power market.

DISCUSSION

Egyptian counterparts agreed that this is a key area of need for international cooperation. The Electricity Law has committed Egypt to opening an electricity market, but the detailed steps in the process still need to be mapped from start to finish. Other regulatory elements will also be crucial to enabling the transition to a competitive market along with adoption of RE. A regulation enabling private to private sale of electricity has been recently adopted and will be an important step in facilitating open trading across the transmission network. Egypt will also need assistance in developing certificates of origin and green electricity credits for RE. Support for developing regulations, adopting new software, and capacity building also would be helpful.

Donors also agreed with the importance of work in this area and the value of further promoting competition and market mechanisms in the power sector and noted ongoing support in this area. Other highlighted needs include support for loss reduction, which participants noted has not improved in recent years, and hedging mechanisms or other arrangements to help private sector actors mitigate risks associated with foreign currency fluctuations, electricity prices, and other variables outside their control. In the area of green hydrogen, finding off-takers was highlighted as a concern.

CROSS-CUTTING THEMES: GENDER AND INCLUSION, ENVIRONMENTAL SAFEGUARDS, AND CIRCULAR ECONOMY

Envisioned changes in the energy sector may have a range of social and environmental impacts, both positive and negative. While the closing of conventional power plants may impact certain workers, the

opening of new renewable plants will create new jobs and economic opportunities. A successful energy transition will facilitate the positive economic, environmental, and social impacts while mitigating as much as possible the negative ones. The workshop discussed technical support with respect to the following areas:

- **Gender equality and social inclusion.** As Egypt embarks on a massive transformation, it is important to ensure equitable economic outcomes for all Egyptians. Technical assistance could go toward specific training, empowerment, and other programs that enable participation of marginalized populations in the energy sector, as well as efforts that integrate gender equality and women's empowerment considerations.
- **Environmental practices.** The environmental impacts of building large amounts of renewable energy in Egypt's deserts need to be mitigated. Support could address the preparation of environmental impact studies in planned renewable zones and around transmission infrastructure and the adoption of methods and practices to mitigate environmental impacts.
- **Circular economy.** Deployment of an estimated 38 GW of renewable energy equipment in Egypt will result in the accumulation of waste after the equipment reaches the end of its useful life. Applying circular economy principles maximizes products' life spans and resource recovery, resulting in less waste, lower emissions, and fewer resources extracted; it also leads to resilient supply chains that are less dependent on imports. Areas of support could include identification of economic opportunities for circular economy, developing necessary regulation, and building end-of-life management and recycling into procurement processes.

DISCUSSION

GoE counterparts noted the value of previous and current programs focused on training women in the energy sector and promoting their career development. They also noted that national organizations such as the National Council for Women are addressing gender issues in the public and private sector.

Donor counterparts noted the challenges associated with achieving a just energy transition, especially ensuring that there is a viable plan to mitigate the impact on workers of retiring specific power plants. An EEHC study is investigating how to align with power sector objectives through training and reskilling workers. More broadly, opportunities around social impact and the promotion of entrepreneurship and jobs in the energy sector must include opportunities for women and marginalized populations. In terms of the environment, circular economy issues need to be addressed and could build on the vision recently adopted by Multilateral Development Banks (MDB)s.

DEMAND-SIDE AND DISTRIBUTED TECHNOLOGIES: ENERGY EFFICIENCY, DISTRIBUTED RE, E-MOBILITY, AND DISTRIBUTION COMPANIES

Egypt's goal of reducing emissions and improving sector performance depends on the adoption of demand-side solutions including distributed technologies, energy efficiency, and the electrification of key end-uses such as hydrogen and transportation. Optimizing how these technologies are deployed and operated will ensure mitigation of stress to the grid and contribute to the integration of larger amounts of variable renewable energy. The workshop discussed technical support with respect to the following areas:

- **End-use energy efficiency programs.** Though there are many opportunities in Egypt to improve energy efficiency, energy subsidies and other challenges may impede the scaling of these solutions. Technical assistance could go toward the design and implementation of energy efficiency incentives and other programs, as well as improving the institutional framework to implement energy efficiency in Egypt.
- **Distributed PV.** Distributed energy resources (DER) can ease congestion and provide resilience, but challenges for the utilities that manage and operate these systems have kept the distributed PV adoption modest. Technical assistance could support utilities in planning for and managing DER. Support to the private sector and financiers could help develop business models and mobilize capital for them to scale.
- **Electric vehicles (EVs).** While Egypt is already creating targets for EVs and working on regulations, efforts are still at an early stage and grid readiness could prove an impediment to scale. Technical assistance could support efforts to strengthen analysis and planning for these technologies and improve the distribution and transmission systems to accommodate EV loads.
- **Distribution sector technologies.** Integrating distributed renewable energy at scale requires distribution companies to actively participate, plan, and invest. Egypt's electricity distribution sector is deploying new technologies, systems, and platforms to improve performance, including pilots for smart meters. Utilities may also play an important role in disseminating distributed technologies, such as energy-efficient electric equipment, and implementing demand-side management programs.

DISCUSSION

This session kicked off with a presentation by EEHC that highlighted priorities around increasing grid efficiency, enabling microgrids, and scaling up DERs. Approaches to scaling include providing a platform that facilitates understanding of the legal requirements and promoting energy efficiency improvements in public buildings. Other GoE entities weighed in on the importance of energy efficiency and the need to promote energy service companies (ESCOs) and superESCOs. Support for EV regulations related to charging stations and grid readiness and overall planning and approaches to encourage EV adoption were also discussed.

Donors agreed about the challenges and opportunities and highlighted the need to require improved energy management practices in industry, system optimization in the industrial sector, and DER in remote areas. Participants agreed that low electricity tariffs could be a barrier to the scale-up of both DER and energy efficiency and that work is needed to support the bankability of such projects. Distribution system losses were also highlighted, with several donors already involved in programs to address this concern.

CONCLUSIONS AND NEXT STEPS

Both GoE and donor participants expressed appreciation for the opportunity to come together and discuss important topics in the energy sector, particularly with such a broad range of GoE counterparts and donors present. They found it valuable to coordinate and align thinking around key efforts with respect to NWFE and the energy sector overall.

After focusing programming on other sectors in recent years, USAID was excited to host this workshop as an initial foray into working in Egypt's energy sector and is both refining opportunities for near-term technical assistance and gathering ideas for the design of a five-year energy program. USAID looks forward to continued collaboration with GoE counterparts and development partners.