OFFICIAL USE ONLY
R2019-0152/1

June 5, 2019

Closing Date: Monday, June 24, 2019
at 6:00 p.m.

FROM: Vice President and Corporate Secretary

Tunisia - Energy Sector Improvement Project

Project Appraisal Document

Attached is the Project Appraisal Document regarding a proposed loan to the Société Tunisienne de l'Electricité et du Gaz with a sovereign guarantee from Tunisia for an Energy Sector Improvement Project (R2019-0152), which is being processed on an absence-of-objection basis.

Distribution:
Executive Directors and Alternates
President
Bank Group Senior Management
Vice Presidents, Bank, IFC and MIGA
Directors and Department Heads, Bank, IFC, and MIGA

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

FOR OFFICIAL USE ONLY

Report No: PAD3220

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN

IN THE AMOUNT OF US$151 MILLION

TO THE

SOCIETE TUNISIENNE DE L'ELECTRICITE ET DU GAZ

FOR AN

ENERGY SECTOR IMPROVEMENT PROJECT

June 3, 2019

Energy and Extractives Global Practice
Middle East And North Africa Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective May 21, 2019)

Currency Unit =	Tunisian Dinar (TND)
TND 3 =	US$1
US$ 0.3 =	TND 1

FISCAL YEAR
January 1 - December 31

Regional Vice President:	Ferid Belhaj
Country Director:	Marie Francoise Marie-Nelly
Senior Global Practice Director:	Riccardo Puliti
Practice Manager:	Erik Magnus Fernstrom
Task Team Leaders:	Moez Cherif, Elvira Morella

ABBREVIATIONS AND ACRONYMS

AFD	Agence Française de Développement
CCGT	Combined Cycle Gas Turbine
CPF	Country Partnership Framework
DFIL	Disbursement and Financial Information Letter
DLI	Disbursement-linked Indicator
EEP	Eligible Expenditure Program
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
EPC	Engineer-procure-construct
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESIP	Energy Sector Performance Improvement Project
FM	Financial Management
FYDP	Five-Year Development Plan
IPP	Independent Power Producer
GBV	Gender-based violence
GDP	Gross Domestic Product
GIZ	Gesellschaft für Internationale Zusammenarbeit
GHG	Greenhouse Gas
GoT	Government of Tunisia
HV	High voltage
JICA	Japan International Cooperation Agency
LV	Low voltage
MV	Medium voltage
PDO	Project Development Objective
PIT	Project Implementation Team
PIM	Project Implementation Manual
PPSD	Project Procurement Strategy for Development
PV	Photovoltaics
RAP	Resettlement Action Plan
RE	Renewable Energy
RPP	Revenue Protection Program
RPF	Resettlement Policy Framework
SOE	State-owned Enterprise
STEG	Tunisian Company of Electricity and Gas
TA	Technical Assistance
TND	Tunisian Dinar
TRP	Tunisian Renewable Program
WBG	World Bank Group

Contents

DATASHEET

BASIC INFORMATION

Country(ies)	Project Name	
Tunisia	Energy Sector Improvement Project	
Project ID	**Financing Instrument**	**Environmental Assessment Category**
P168273	Investment Project Financing	B-Partial Assessment

Financing & Implementation Modalities

[ ] Multiphase Programmatic Approach (MPA)	[ ] Contingent Emergency Response Component (CERC)
[ ] Series of Projects (SOP)	[ ] Fragile State(s)
[✓] Disbursement-linked Indicators (DLIs)	[ ] Small State(s)
[ ] Financial Intermediaries (FI)	[ ] Fragile within a non-fragile Country
[ ] Project-Based Guarantee	[ ] Conflict
[ ] Deferred Drawdown	[ ] Responding to Natural or Man-made Disaster
[ ] Alternate Procurement Arrangements (APA)	

Expected Approval Date	Expected Closing Date
24-Jun-2019	30-Jun-2024

Bank/IFC Collaboration

No

Proposed Development Objective(s)

The Project Development Objective (PDO) is to: (i) strengthen Tunisia's electricity transmission system; and (ii) improve STEG's commercial performance.

Components

Component Name	Cost (US$, millions)

Strengthening the electricity transmission network	131.00
Commercial performance improvement	20.00

Organizations

Borrower:	STEG
Implementing Agency:	STEG

PROJECT FINANCING DATA (US$, Millions)

SUMMARY

Total Project Cost	151.00
Total Financing	151.00
of which IBRD/IDA	151.00
Financing Gap	0.00

DETAILS

World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	151.00

Expected Disbursements (in US$, Millions)

WB Fiscal Year	2019	2020	2021	2022	2023	2024
Annual	0.00	44.41	51.69	39.06	14.85	1.00
Cumulative	0.00	44.41	96.10	135.15	150.00	151.00

INSTITUTIONAL DATA

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

Climate Change and Disaster Screening

This operation has been screened for short and long-term climate change and disaster risks

Gender Tag

Does the project plan to undertake any of the following?	
a. Analysis to identify Project-relevant gaps between males and females, especially in light of country gaps identified through SCD and CPF	Yes
b. Specific action(s) to address the gender gaps identified in (a) and/or to improve women or men's empowerment	Yes
c. Include Indicators in results framework to monitor outcomes from actions identified in (b)	Yes

SYSTEMATIC OPERATIONS RISK-RATING TOOL (SORT)

Risk Category	Rating
1. Political and Governance	Substantial
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Moderate
6. Fiduciary	Moderate
7. Environment and Social	Substantial
8. Stakeholders	Moderate
9. Other	
10. Overall	Substantial

COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

[ ] Yes [✓] No

Does the project require any waivers of Bank policies?

[ ] Yes [✓] No

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	✓	
Performance Standards for Private Sector Activities OP/BP 4.03		✓
Natural Habitats OP/BP 4.04	✓	
Forests OP/BP 4.36		✓
Pest Management OP 4.09		✓
Physical Cultural Resources OP/BP 4.11		✓
Indigenous Peoples OP/BP 4.10		✓
Involuntary Resettlement OP/BP 4.12	✓	
Safety of Dams OP/BP 4.37		✓
Projects on International Waterways OP/BP 7.50		✓
Projects in Disputed Areas OP/BP 7.60		✓

Legal Covenants

Sections and Description

Section I.A.1 of Schedule 2 of the Legal Agreement: The Borrower shall, no later than fifteen (15) days after the Effective Date, or such later date as agreed by the Bank, appoint and thereafter maintain, throughout Project implementation, the Project Implementation Team with composition, terms of reference and resources acceptable to the Bank and defined in the Project Implementation Manual, to be responsible for day-to-day implementation, monitoring and evaluation of the Project

Sections and Description

Section I.B.1 of Schedule 2 of the Legal Agreement: The Borrower shall carry out the Project in accordance with the ESMF and the RPF. Except as otherwise agreed by the Bank, the Borrower shall not amend, abrogate, waive, or fail to enforce the ESMF or the RPF, or any of their provisions

Sections and Description

Section I.B.6 of Schedule 2 of the Legal Agreement: The Borrower shall: (a) as soon as reasonably practicable, but no later than five (5) calendar days after the occurrence of a Significant Event, inform the Bank by any electronic means of the nature of the incident, accident, or circumstance and any effect or impact (whether on-site or off-site) resulting or likely to result there from; (b) as soon as reasonably practicable, but no later than thirty (30) calendar

days after such Significant Event, provide the Bank with a summary report that includes a description of such Significant Event, and the measures, if any, that the Borrower is taking or plans to take to address such Significant Event and to prevent any future similar event; and (c) keep the Bank informed of the on-going implementation of the said measures and plans.

Conditions

Type	Description
Disbursement	Section II. B. 1 (b) of Schedule 2: No withdrawal shall be made for payments under Category (2) until and unless the Borrower has furnished evidence satisfactory to the Bank with respect to the achievement of the respective Disbursement-Linked Results (DLRs) as referred to in Schedule 4 to this Agreement and the additional supporting documentation set forth in the Disbursement and Financial Information Letter
Type	Description
Disbursement	Section III.B.2 of Schedule 2: Notwithstanding the provisions of Part B.1(b) of this Section, if any of the DLRs referred to in Schedule 4 to this Agreement has not been achieved, the Bank may, by notice to the Borrower: (a) reallocate all or a portion of the proceeds of the Loan then allocated to said DLR to any other DLR; and/or (b) cancel all or a portion of the proceeds of the Loan then allocated to said DLR

I. STRATEGIC CONTEXT

A. Country Context

1. **A sustained transition to democracy and an ambitious reform agenda have marked Tunisia's path since the 2011 revolution.** Tunisia is a lower-middle-income country, with a population of 11.6 million and a gross domestic product (GDP) of US$40.3 billion (2018). Often hailed as the only success story of the Arab Spring, the country has made great strides toward establishing the fundamentals of democracy, including the formation of the National Dialogue Quartet in 2013 and the introduction of a new constitution in 2014. The Government of Tunisia (GoT) has also embarked on an ambitious reform agenda, aimed at boosting civil society and democratic freedom as well as stimulating private sector driven growth and job creation. In 2016, the GoT adopted the Five-Year Development Plan 2016–2020 (FYDP), followed by the Economic and Social Roadmap 2018–2020, aimed at accelerating the implementation of reforms focused on macroeconomic and fiscal stabilization; the modernization of social safety nets; and the enhancement of private investment, competitiveness, and productivity. In May 2018, the first free and fair municipal elections were held, further anchoring the democratic culture and laying the groundwork for decentralization.

2. **The economic situation remains fragile, despite recent modest increase in growth and efforts to contain the fiscal deficit**. The instability in the aftermath of the revolution, due to political unrest and terrorist attacks, weakened the investment climate and severely affected economic sectors, such as tourism, that were traditionally engines of growth and sources of foreign exchange. To counter social tensions, the GoT embraced expansionary fiscal policies, including public sector hiring and wage increases, which have impaired public finances. The fiscal deficit and public debt respectively reached 4.6 percent and 74.0 percent of GDP in 2018[1]. In addition, the current account deficit widened to 11.0 percent in 2018, and in May 2019, gross international reserves stood at 75 days import cover[2]. Despite these macroeconomic vulnerabilities, GDP growth recovered in 2018 to reach 2.5 percent. This was largely due to stronger performance of the agriculture, services, and export-oriented manufacturing sectors. Progress in terms of poverty reduction and shared prosperity has, however, been slow. In particular, the poverty headcount ratio stood at 15 percent in 2015, and disparities among regions and age groups have persisted or widened. In this context, unemployment has remained extremely high, especially for young educated graduates, women, and populations in the interior regions. Total unemployment stands at 15.4 percent (2017) and has been much higher among young graduates (30.2 percent), women (23.1 percent), and populations in the interior regions (over 25 percent in the South-West and South-East, compared to 10 percent in the Center-East and North-East). Significant disparities in labor participation between women and men also exist: in 2017, 25 percent of women were active in the labor force compared to 71 percent of men; and 31 percent of young women were not in education, employment, or training, compared to 19 percent of young men[3].

3. **Structural reforms are most needed to put Tunisia on a more inclusive and sustainable growth path.** The country's fiscal imbalance may to set back hard-earned social and economic development gains. While most of public resources have so far been absorbed by the impending needs of the post-revolution context, going forward, Tunisia needs to focus on broad-based and sustainable growth. This entails concrete actions to consolidate the country's macroeconomic and fiscal situation and boost private investment, trade and entrepreneurship. Equally important is to strengthen governance and provide equal opportunities to all. To this extent, the FYDP delineates an ambitious program along five axes: (i) increasing resources for the economy; (ii) fiscal consolidation; (iii) human capital development; (iv)

[1] Source: IMF.
[2] World Bank. World Development Indicators 2018.
[3] World Bank 2014. *Tunisia and the Fight for Inclusion*.

redesign of the social security system; and (v) improving business climate and increasing private investment. In 2016, the International Monetary Fund (IMF) approved a four-year Extended Fund Facility (EFF) of US$2.9 billion geared towards supporting fiscal consolidation and private sector development, with actions including, among others, reduction of distortive subsidies, expansion of social protection and financial sector reform. In May 2018, the World Bank also approved a US$500 million Investment, Competitiveness and Inclusion Development Policy Financing (DPF), a standalone single-tranche operation with financing linked to critical reforms including: (i) removing barriers to investment, trade and entrepreneurship; (ii) improving the financial viability and efficiency of the energy sector; and (iii) promoting greater economic and social inclusion.

B. Sectoral and Institutional Context

4. **Tunisia's electricity sector faces three main challenges: high dependence on imported fuel, distortive subsidies and weak commercial and financial performance at the utility level.** Despite low economic growth, primary energy demand has increased steadily since the revolution, with gas demand quadrupling compared to 1990s' levels. Peak electricity demand also increased at a high pace (around 5 percent per year between 2010 and 2018). However, the vertically integrated public electricity and gas utility (*Société Tunisienne d'Electricité et de Gaz* - STEG) has struggled to expand its installed generation capacity, which grew by only 3.6 percent per year between 2010 and 2018 (as opposed to 7-8 percent per year in the 2000s). Although it has been able to guarantee reliable electricity supply, STEG's commercial performance has been steadily declining in recent years due to increasing theft and lower customer payment discipline since the revolution. This, together with the widening gap between tariffs and average cost due to rising gas prices to generate power and the depreciation of the Tunisian dinar, has weakened the utility's financial bottom line severely, making it heavily dependent on direct transfers from the government. The GoT faces tremendous pressure to increase investments and raise sector management capacity, but distortive electricity and fuel subsidies severely constrain the available fiscal space. As a thriving energy sector is the building block to consolidate the social contract in Tunisia and raise firm competitiveness, addressing these challenges is key to promote inclusion and attract private sector development and growth in Tunisia.

5. **As electricity demand continues to increase, overreliance on imported hydrocarbons threatens Tunisia's energy security and has made the sector, and its customers, vulnerable to price and exchange rate fluctuations.** Natural gas and oil respectively account for 53 and 47 percent of Tunisia's primary energy demand in 2018. In terms of electricity generation, 83 percent derives from open and combined cycle gas turbines, 15 percent from dual fuel steam units (natural gas and heavy fuel oil) and 2 percent from renewables, mostly wind[4]. Once a net exporter of oil and gas, the country has become heavily dependent on external supply to meet its energy needs, especially for electricity generation. Exploration of upstream oil and gas largely declined in recent years, and protest movements also disrupted production and transport of fuels. More than half of natural gas, 72 percent of which is used for electricity production, is imported from Alegria; part of this is paid as gas transit fee. As a result, overall dependency on energy imports reached 51 percent in 2018 (compared to 7 percent in 2010)[5] and will likely continue to increase in the future, reducing Tunisia's energy security. The dependence on a single source of gas supply makes Tunisia extremely vulnerable to supply interruptions. Moreover, gas imports are priced in USD, against which the Tunisian Dinar has been depreciating steadily (by 8 percent between 2017 and 2018). The price of gas also fluctuates with international crude oil prices (which increased by 31 percent in 2017-2018) and the GoT has not adjusted end-user tariffs accordingly. Projections anticipate a shortage of primary energy, particularly

[4] Ministère de l'Energie, des mines, et des Energies Renouvelables, Conjoncture Energétique, Rapport Mensuel, Décembre 2018. Version du 25 Janvier 2019.
[5] Ibid.

natural gas, starting in 2023. Although there are opportunities for developing new gas fields domestically, reserves are limited and uncertain. Until 2017, end-user tariffs were relatively stable as the GoT used subsidies to compensate for the fluctuating international fuel prices and a depreciated currency. The growing pressure of subsidies on the fiscal deficit has forced the GoT to embrace a subsidy reform that makes tariffs more cost-reflective.

6. **The high subsidization of the energy sector poses critical risks to macro-fiscal stability and diverts precious public resources away from welfare-enhancing investments.** All energy products, including oil products, LPG, natural gas and electricity[6], are subsidized. Fuel and electricity subsidies cost 1.6 percent of GDP in 2017 and 2.5 percent of GDP in 2018[7], and accounted for more than one-third of the fiscal deficit. Besides imposing a heavy burden on public finances and impairing the financial viability of the energy sector as a whole, subsidies are regressive. Fuel subsidies, with the exception of LPG, disproportionally benefit wealthier customers and more than half of subsidies for natural gas and electricity accrue to industrial and commercial customers. Lifting subsidies will not only allow for resources to be directed toward those most in need, for example through social safety nets, but will also encourage more efficient consumption of energy.

7. **Power sector performance and financial viability are affected by STEG's deteriorating commercial performance.** STEG is responsible for electricity service throughout the value chain, for transmission and distribution of natural gas, and, since 2015, for gas imports from Algeria. In 1996, the generation segment was opened to independent power producers (IPPs), which can produce and sell electricity to STEG. Currently, 18 percent of electricity supply is provided by one IPP; 82 percent is generated by STEG and a small amount through industrial self-generation. Transmission and distribution remain under STEG's monopoly, which caters to almost four million electricity customers (representing nearly universal access) and 850,000 natural gas customers. While the utility has sound technical competencies, its commercial capacity has fallen below international benchmarks. Before the Revolution in 2011, STEG had one of the lowest rates (around 10 percent) of overall losses in Africa and was comparable to many countries in Europe. Since then, losses have risen reaching 18 percent in 2017, mainly due to the growth in commercial losses. While all of STEG's clients are metered, electricity theft has been a growing challenge since the Revolution, reflecting a deterioration of the social contract. The treatment of suspected fraud cases decreased from 83 percent in 2014 to 62 percent in 2018; and less than 8 percent of cases validated for disconnection are enforced. On the other hand, STEG has not been able to respond to growing demand for customer care (the number of customer complaints increased seven-fold since 2009) with better service and interface, resulting in a negative perception on the energy sector and services, especially among female customers. The collection rate has also deteriorated, partly due to the economic instability and the depreciation of the Tunisian dinar, which lowers the ability to pay of firms and households[8], and partly due to people's decreasing payment discipline.[9] As result, accumulated unpaid bills have reached TND1.3 billion in 2018, equal to 28.3 percent of STEG's annual revenues.

8. **Despite significant gains in revenue, STEG's costs have also increased and are highly influenced by international oil prices, resulting in its negative net profit since 2010.** STEG revenues more than doubled from 2008 to 2017, from

[6] Subsidies are mostly allocated to electricity (37%), LPG (26%), diesel (17%), and natural gas (13%). LPG remains the most heavily subsidized product, with its price covering only 30% of the cost.

[7] Source: Bank's calculations. These values are the subsidy paid to SOEs. The actual subsidy, estimated using the price-gap methodology, is much higher. This methodology defines energy subsidies as the difference between the domestic market price and the total cost of supply, including production, transport, and distribution costs and taxes, multiplied by domestic consumption. The production cost is based on the price of Brent and exchange rate.

[8] The electricity tariffs in Tunisia, at approximately UScents7.7/kWh on average, remain relatively affordable compared with countries of similar income level.

[9] STEG's rate of disconnection in case of nonpayment is only 5 percent by 2018.

TND1.9 to TND4 billion, mainly because of (i) a significant increase in electricity sales (28 percent), and (ii) a progressive increase in electricity tariffs (44 percent for LV clients and 57 percent for MV/HV clients since 2010, respectively). Nevertheless, STEG's operating costs increased from TND3 billion to TND4.6 billion. Fuel purchases and IPP payment account for more than 80 percent of the cost of electricity and are highly dependent on international oil price fluctuations, to which the gas import from Algeria is indexed[10], as well as exchange rate variations. STEG's financial costs also increased significantly, from TND0.13 billion in 2008 to TND1.05 billion in 2017, due to the devaluation of the dinar, as its financial operations are denominated in foreign currency. In 2018, average tariffs (at 190 millimes/kWh before tax or US$0.077/kWh) accounted for only 74 percent of total costs. As a result, the utility has suffered from negative net profit since 2010, reaching a total of TND1.8 billion in 2017 (US$735 million) or 42 percent of total revenues. This has made STEG the largest loss maker among Tunisia's 20 biggest SOEs. Subsidies have had a paramount importance in keeping the utility afloat, totaling TND15.8 billion over 2008-2017, with a peak of TND3 billion in 2013, but have not been enough to cover the financial gap. In 2017, STEG suffered a loss of TND1.2 billion even after subsidy transfer. Insufficient revenues have in turn required STEG to borrow and the large total debt (increased from TND1.53 billion in 2008 to TND6.44 billion in 2017), 99 percent of which contracted in foreign currency, poses concern in light of the rapid TND depreciation in recent years. As a result, STEG's debt to equity ratio became unsustainable for the first time in 2016[11], and 2017 was marked by a net negative equity.

9. **STEG's performance deterioration in recent years is not unique; it is a common feature among most SOEs in Tunisia.** This has led the GoT to adopt a reform policy for SOEs, developed with assistance from the French Development Agency (AFD) in 2017-2018.[12] The policy includes four key recommendations that are applicable to STEG: (i) develop a state ownership policy that separates the role of the GoT as owner, policy maker and regulator of relevant sectors; (ii) transfer SOE ownership from line ministries to a central entity, thus reducing conflicts of interest between the various roles of the government; (iii) strengthen the board of directors of each SOE, by including independent directors and possibly an employee representative; and (iv) pilot the reform for a core group of SOEs, including STEG, focusing on strengthening internal controls and financial reporting. The SOE reform is expected to remain on the agenda of the next government following the general elections in late 2019.

10. **The development of renewable energy is instrumental in addressing the challenges above, and marks the transformation of Tunisia's power sector, including towards significant private participation.** The GoT has recently launched the Tunisian Renewable Program (TRP), which seeks to increase the share of renewables in the country's energy mix to 30 percent by 2030. This is unprecedented and transformational. TRP is to be achieved in three phases: 1.28 GW of wind and solar capacity are expected to be commissioned by 2020; an additional 1.25 GW during the period between 2021 and 2025; and a further 1.25 GW between 2026 and 2030. Such a significant volume of renewable energy (RE) will critically help counter the erosion of the country's energy independence and reduce the carbon footprint of power production. The integration of more cost-efficient, endogenous energy sources will reduce STEG's vulnerability to international oil prices, and hence help strengthen the financial bottom line of the electricity sector as a whole and ease its burden on public finances. Electricity costs will stabilize overtime and will reduce the need for tariff increases that will

[10] Indirect subsidies on gas import for power generation were removed in 2016.
[11] D/E ratio is a solvency ratio typically used by international financial institutions as a financial covenant in concessional loans to make sure that the Borrower ensures a certain level of financial sustainability. Typically, D/E ratios should be lower than 5, meaning than SOEs should ensure that their equity represents at least 20 percent of their long-term debt, to better take into account the long-term financial sustainability of the Borrower. STEG's D/E ratio was 5.2 in 2016 and -19.5 in 2017.
[12] *Livre Blanc: Rapport de synthèse sur la réforme des entreprises publiques en Tunisie*, Presidency of the Governement, March 2018.

inevitably hit customers. TRP also marks Tunisia's shift towards a more open power market, with the private sector acquiring a significant share of the generation segment.

11. **The GoT intends to contract two-thirds of RE capacity to the private sector under three schemes**: (i) concessions for large-scale projects (a competitive selection process for investors is underway for a total capacity of 1000 MW); (ii) authorization for small-scale projects; and (iii) self-generation for industrial, agriculture and service sector users. STEG is expected to develop the remaining RE generation additions. GoT plans to develop two new gas-fired combined cycle power plants (Skhira 1 and 2) of approximately 500 MW each, the first as a public-sector plant by 2022[13], and the second as an IPP in subsequent years. These plants are essential to provide grid stability as significant RE is integrated in the power system. Tunisia's large potential for solar and wind energy also provides an important growth opportunity for the country, if the added RE capacity is used for electricity export purposes, once Tunisia is connected to the European energy market through the Tunisia-Italy Power Interconnector (Elmed Project).

12. **The expansion of transmission capacity is critical to enable the integration of renewable energy and reliable energy supply over the long term.** Tunisia's large RE potential is located in the south, while the main electricity demand centers lie in the north of the country. Connecting the two areas through a capable north-to-south high-voltage (HV) transmission backbone and interconnections to the new power generation sites is therefore a condition for the development of renewable energy and to ensure that cost-efficient and cleaner electricity supply reaches centers of high demand. Investments in transmission capacity expansion are thus most needed to allow the optimal generation and dispatch of electricity, leveraging different energy sources, and enabling the development of the more cost-efficient and sustainable RE, while maintaining system reliability and grid stability. The availability of transmission infrastructure is also critical to improve investor confidence in RE, as it provides an insurance that the newly developed capacity will be integrated into the system and dispatched in line with the contractual arrangements agreed with STEG. Finally, the adequacy of the national transmission system is critical to exploit the benefits of regional connectivity once the Elmed Project is completed. Power flowing from regional markets will allow more and more intermittent RE to be accommodated in Tunisia's energy matrix; on the other hand, Tunisia will be able to monetize RE exceeding domestic needs through exports.

13. **The successful transition to a more open and competitive power market depends on key building blocks, including a robust institutional and regulatory framework, greater financial viability at the sector level, and a national utility able to embrace its changing role.** The Ministry of Industry and SMEs, which is at the helm of the energy sector, was restructured in 2018 to bring the former Ministry of Energy and Mines under its fold. The Ministry is responsible for sector policy and oversight, and in the absence of an independent regulatory agency, for regulation as well. The Ministry of Finance is responsible for financial oversight of STEG and for annual subsidies. The Ministry of Development, Investment and International Cooperation approves the public investments of STEG through the National Commission for Approval of Public Projects. This relatively simple institutional architecture, shaped around a monopolistic and mostly public power market, may show inherent limitations as the power market becomes more complex. In this context, robust regulations are needed to balance the interests of the wider array of stakeholders, including the incumbent utility, the government, IPPs and the consumers, as auto- and distributed generation begins to take ground. The degree and quality of private sector participation is very much driven by the investment climate, which hinges upon adequate regulation. Recognizing these challenges, the GoT is seeking to establish an independent Regulatory Authority responsible for providing generation licenses, setting requirements for power grid connection and granting third-party access to the electricity network for auto-producers, with the ultimate objective of guaranteeing a level playing field for all generators. The role of the Authority may well be expanded to energy tariff setting, as well as monitoring the performance of sector operators, to

[13] Private sector participation in this first plant is now being considered.

ensure that inefficiencies are not passed on to consumers. It will be important that STEG is endowed with a financial model suited to its changing role and obligations in Tunisia's evolving power market. The significant integration of RE promises to change the cost drivers and financial bottom line of the utility, which will need to invest heavily in the expansion/reinforcement of its transmission system to access a more cost-efficient and diversified power supply. STEG plans to conduct analysis and develop a sound model to better understand and manage these trade-offs.

14. **The sustainability of the electricity sector transformation will hinge on the reform of subsidies and electricity tariff setting and enforcing cost-recovery**. Prospects for a well-functioning and financially sustainable energy sector rest on GoT's commitment to regular price adjustments in line with the fluctuations in international oil prices and exchange rates. As part of fiscal consolidation efforts under the FYDP, the GoT has begun enforcing energy price increases, including electricity, with the ultimate objective of eliminating energy subsidies by 2022.[14]

15. **STEG will need to strengthen its performance and adapt to its changing role to operate successfully in the new market context**. Improving STEG's commercial performance and reducing inefficiencies can critically complement efforts to improve the utility's and sector's financial bottom line and will help attract private participation in Tunisia's power sector by positioning STEG as a more credible off-taker of renewable and conventional energy produced by IPPs. At the same time, STEG's role will change considerably in the coming years. In a power market where the generation business is increasingly fragmented, the company will need to become a more sophisticated transmission system operator faced with accommodating growing volumes of variable renewable energy (VRE). This will require better planning capacity to ensure system stability and security, as well as enhanced operational, dispatch and control functions. On the other hand, the market transition will naturally have implications on how STEG is organized and managed. STEG signed a performance contract with the GoT for the 2016-2020 period, with clear quantitative annual targets in terms of RE generation, network expansion, and reduction of technical and commercial losses. While key targets have been missed so far, going forward commercial performance, financial viability and customer service need attention for STEG to be able to operate successfully in Tunisia's changing energy market and higher customer expectation. Overall, it is important that STEG evolves to be far more consumer-oriented, which will inevitably require a shift in its management approach and a realignment of its competencies. Equally important is to develop a financial model suited to accommodate STEG's changed business circumstances, and the related impacts on the company's cost structure and financial trade-offs.

16. **The proposed Project is part of an overall development program involving several partners supporting Tunisia's electricity sector transformation.** The program is geared to supporting: (i) the energy transition; (ii) electric system stability and reliability; and (iii) improvement of STEG's commercial performance, financial viability and customer service. The program builds on coordinated assistance from the Bank, AFD, and the European Investment Bank (EIB). Specifically, upon GoT's request, the Bank, through the proposed ***Energy Sector Improvement Project*** (the Project or ESIP), will take the lead in supporting the energy transition by financing investments in transmission capacity that are the most critical to enable the integration of privately-produced RE generation. While ESIP also includes measures to improve STEG's commercial performance, the bulk of support in this area is being provided by the AFD under the *Smart Grid Project* (SGP; Euro 120 million), which finances the installation of 20,000 smart meters for all STEG's medium-voltage (MV) and high-voltage (HV) customers; 400,000 smart meters for low-voltage (LV) clients in a pilot region (Sfax); as well as the installation of the needed customer geographic information system. In parallel, support targeting STEG's technical performance is expected to be provided by EIB. EIB has expressed interest in financing investments in the rehabilitation and upgrading

[14] Note de Cadrage de la Politique de Réforme des Subventions Energétiques 2018-2022

STEG's electricity and gas distribution, which will help reduce losses and improve the quality of service. Additional partners are providing support beyond this program[15].

17. **The World Bank Group (WBG) has established a diversified and integrated program to help Tunisia address the most impending challenges and transformational opportunities facing the energy sector**. Policy dialogue and collaboration with the GoT on the subsidy reform is mainstreamed through the 2018 DPF, which includes three energy sector-related prior actions, including, in addition to progressive subsidy removal, STEG's performance improvement and advancement of IPP program for renewables. Another key component of the WBG program is the extensive analysis and technical assistance being provided through the ESMAP-funded *Technical Support to Improve Performance and Enhance Financial Viability of the Tunisian Energy Sector (ESMAP TA)*. The ESMAP TA is intended to help improve the financial, technical, and commercial performance of STEG by providing: (i) an operational and management diagnosis of the utility; and (ii) a detailed plan (Performance Improvement Plan – PIP) of investments and reforms to enable STEG to meet the targets of its performance contract; (iii) support to establish the Electricity Regulatory Authority. The TA fits in well with GoT's SOE reform objectives described above; in particular, the diagnosis and PIP will help prepare the next performance contract for the period 2020-2024, and the setting up of an electricity regulatory authority will pave the way for better sector governance. The TA also complements subsidy reform efforts by supporting the design of social measures mitigating the impact of increasing fuel and electricity prices on households and firms, as well as the implementation of a national communication campaign to build consensus around the reform. The Bank has provided a grant of US$13 million (from ESMAP and the Global Infrastructure Facility, GIF) to help advance the preparation of the Elmed Project. Finally, the Bank is providing TA services to the GoT for the development of concentrated solar power (CSP) generation capacity under the MENA CSP Knowledge and Innovation Program (MENA CSP KIP) funded by the Clean Technology Fund (CTF).

18. **The Bank is working in partnership with IFC to help strengthen the RE and private sector participation agenda**. Together with the German Development Agency (GIZ) and the European Bank for Reconstruction and Development (EBRD), IFC has provided technical support to the Ministry of Industry and STEG for the RE concession scheme; IFC may also assist in the preparation of the future gas-fired IPP. IFC and EBRD may participate in financing RE IPPs under the ongoing selection process. IFC is also financing a study to establish a transparent process for connecting IPPs, including a methodology to define connection costs to be charged to IPPs, as well as the rules and procedures governing requests for connection to STEG.

C. Relevance to Higher Level Objectives

19. **The proposed Project will help reduce poverty and boost shared prosperity in Tunisia as envisaged under the World Bank Group's Tunisia Country Partnership Framework (CPF) for 2016-2020, recently re-validated and extended by one year through the Performance and Learning Review (2018).** By tackling key sector inefficiencies and constraints, such as inadequate transmission capacity and commercial losses, the Project will enable the expansion and diversification of energy supply, private investment in RE, and a stronger financial standing of the electricity sector. Overall, this means transforming the electricity sector into an engine of growth and shared prosperity, one that may contribute to the country's competitiveness and create jobs and income. These are key objectives under Pillar 1 (Restoring an Environment Conducive to Sustainable Economic Growth and Private Sector-Led Job creation) of the current CPF.

[15] The Islamic Development Bank (IsDB) and the African Development Bank (AfDB) are financing investments worth Euro 110 million and Euro 126 million respectively to reinforce STEG's transmission network, with the objective of reducing technical losses and improving service reliability. Furthermore, the European Bank for Reconstruction and Development (EBRD) is providing technical assistance to STEG to strengthen the utility's compliance, reporting, and accounting capacity (transitioning to International Financial Reporting Standards). EBRD is also helping STEG improve its exchange rate, interest rate and commodities risk management as well as the methodology to forecast electricity and gas demand.

20. **The Project is instrumental to the sustainable development agenda under Tunisia's FYDP and key energy sector strategies.** The integration of more cost-efficient RE will help reduce dependence on imported gas, and therefore contain the pressure of fluctuating international oil prices on domestic energy tariffs. On the other hand, as STEG's commercial performance improves, the financial gap of the electricity sector will be narrowed. The two effects combined will significantly reduce the need for subsidies. As result, the Project will contribute to Tunisia's fiscal and macroeconomic consolidation, which is the ultimate goal of the FYDP. The Project will also help achieve other key FYDP's objectives. Specifically, Pillar 2 (Shifting to a Hub Economy) targets increased productivity as a means for raising competitiveness in the country; Pillar 5 (Promoting Green Growth for Sustainable Development) seeks to reduce the carbon footprint of the energy sector through a shift to a greener energy mix and a more rational energy consumption. Diversification of the energy mix and sustainable energy development are also envisaged under Tunisia's energy strategy (*Vision Stratégique du Secteur de l'Energie 2050)*.

21. **The proposed Project will contribute to deliver results towards Maximizing Finance for Development (MFD), which is a key pillar under the expanded Middle East and North Africa (MNA) Regional Strategy.**[16] Investments in transmission capacity are key to enable the integration of privately-produced RE generation and support the establishment of a more competitive electricity generation market, two objectives that mark the GoT's new orientation towards private sector participation. Support from the Bank can help build the enabling conditions. MFD is a major component of WBG's engagement in MNA, as emphasized by the expanded regional strategy branded as "*#OpenforBusiness*". In an MFD logic, the transmission segment constitutes a suitable area for targeting Bank investment project financing, with the ultimate objective of helping to unlock private participation in RE. Specifically, as the RE market is being established in Tunisia, the availability of adequate transmission infrastructure reduces barriers faced by new entrants and will boost private investors' interest. As noted above, private investment is conditional on STEG's becoming a credible off-taker of electricity produced by IPPs, which can only be achieved once STEG's performance has improved. This is the target of the extended assistance provided by WBG and under the overall program supported by AFD and EIB. The lower the risks associated with RE investments, the lower the prices for solar power that STEG will be able to negotiate with IPPs. Overall, the Project alone will help leverage US$500-600 million[17] of private investments in RE by 2022, and pave the way for much larger RE IPP volumes as expected over the longer term under the TRP.

22. **The Project also contributes to Tunisia's broader climate change agenda.** Tunisia's development agenda is focused on ensuring spatially balanced growth as well as environmental sustainability. Green growth and climate change goals are an integral part of such an agenda, which is also reflected in the FYDP. In its Intended Nationally Determined Contribution (INDC) presented at the COP21, the GoT proposed to reduce greenhouse gas (GHG) emissions across all sectors to lower the country's carbon intensity by 41 percent in 2030, relative to the base year 2010. Mitigation efforts will need to be particularly centered on the energy sector, which by 2030 aims to reduce its carbon intensity by 46 percent, compared to 2010. The energy transition supported under the Project will contribute materially to reaching this objective. It will also pave the way for a deeper decarbonization over the long term, to be pursued through the electrification of numerous energy usages, along with a continued shift from fossil-fuels to renewable sources of electricity production. Significant measures of end-use efficiency to tame the growth of demand will also form a part of Tunisia's energy sector policies.

[16] Middle East and North Africa Regional Update 2019 - *#OpenforBusiness,* The World Bank Group

[17] This estimate relates to only 5 solar photovoltaic IPPs to be commissioned in the immediate term and that the Project will help integrated into Tunisia's power network. The overall private investment in RE is expected to be several times larger, as it includes all RE IPPs (including wind) to be developed by 2030 under the TRP.

II. PROJECT DESCRIPTION

A. Project Development Objective

PDO Statement

23. The Project Development Objective (PDO) is to: (i) strengthen Tunisia's electricity transmission system; and (ii) improve STEG's commercial performance.

Result Indicators

24. The achievement of the PDO will be measured through the following PDO level results indicators:
- Increased transmission capacity along the South-North corridor (MW)
- Increase in cash recovery index[18] (percent)

25. Intermediate indicators for Component 1 are detailed in the Results Framework. In addition, there are four intermediate results indicators aligned with disbursement-linked indicators (DLIs), as detailed in Table 1.

B. Project Components

26. The proposed Project is intended to support two key dimensions of energy sector transformation in Tunisia: (i) diversifying sources of electricity away from imported hydrocarbons by helping integrate and transmit lower-cost, privately-produced renewables-based generation capacity; and (ii) improving STEG's financial health by strengthening its commercial performance. Accordingly, the Project is articulated along the following two components.

27. ***Component 1: Strengthening the electricity transmission network (US$131 million).*** This will provide support for the expansion and reinforcement of Tunisia's power transmission system through the following activities:

(a) Construction of approximately 384 km of high-voltage transmission lines, including: (i) approximately 284 km of high-voltage lines connecting Skhira with Kondar and with Thyna, and Kondar with the Bouficha-Sousse transmission line; and (ii) construction of approximately 100 km of high-voltage lines to connect the 200 MW solar photovoltaic (PV) power plant in Borj Bourguiba. (The PV power plant is expected to be commissioned in 2022 under a concession regime, outside the project.)

(b) Construction, extension and/or reinforcement of the following substations: (i) construction of a 400/225 kV substation in Kondar to connect the 400 kV line with the existing 225 kV central corridor; and (ii) the extension of the existing substations at Thyna and Tataouine.

28. A detailed description and technical analysis of this component is presented in Annex 2.

29. This component is expected to yield climate co-benefits as part of the Multilateral Development Banks' (MDB) list of eligible mitigation activities under Category 1.3, "new, expanded and improved transmission systems (lines, substations) to facilitate integration of renewable energy into grids".[19]

[18] The cash recovery index is defined as the billing efficiency (ratio of energy billed over energy consumed) multiplied by the collection efficiency (ratio of consumer bills paid over total consumer bills).
[19] MDBs, 2016. 2015 Joint Report on Multilateral Development Banks' Climate Finance

30. ***Component 2: Commercial performance improvement (US$20 million).*** This component will provide financing for payments under the Eligible Expenditure Program (EEP) in support of the strengthening of STEG's commercial performance through the following activities: (i) monitoring and metering consumption of high voltage and medium voltage electricity customers in real time; (ii) securing revenues from low voltage electricity consumers with large consumptions; (iii) improving the collection rate of private customers, including households; (iv) improving the measurement of consumption through the provision of hand-held devices to STEG staff; and (v) launching citizen engagement campaigns and public consultations to raise awareness on customers' rights and responsibilities, solicit customer feedback, and improve the orientation of services to beneficiary needs.

31. This component will support results-based practices and management by STEG to improve its commercial performance and is designed in complementarity with the AFD-financed SGP. Commitments to be undertaken by STEG, as defined below, will leverage the infrastructure and practices to be put in place under SGP, and will ultimately help achieve major progress in terms of commercial performance. This will enable STEG to meet the targets of the performance contract with the GoT and provide more efficient and better service to customers.

32. Disbursement Linked Indicators (DLIs) and related target values are presented in Table 1. DLIs are phased along the five years of project implementation and are intended to incentivize STEG to implement actions geared towards: (i) monitoring and metering consumption of high-voltage and medium-voltage electricity customers in real time; (ii) securing revenues from low voltage electricity consumers with large consumption; (iii) improving the collection rate of private customers, including households; (iv) improving the measurement of consumption through the provision of hand-held devices to Borrower's staff; and (v) launching citizen engagement campaigns to raise awareness of customers' rights and responsibilities. All DLIs are scalable, with funds being disbursed in proportion to achievement of the DLI[20].

33. The associated Eligible Expenditure Program (EEP) will finance recurrent expenditures incurred by STEG, notably for the purchase of electricity from the Carthage Power Company (CPC). CPC is the only IPP in Tunisia's power market, owning and operating a 471 MW gas-fired power generation facility in Radès, which accounts for 19 percent of power supply in the country. The ability of STEG to honor payments for electricity purchased from IPPs is key to enable a reliable service to electricity customers. It can also increase STEG's credibility as partners of IPPs, in view of attracting private investors in RE. The EEP will relieve financial stress on STEG, as the utility approaches investments in transmission capacity and the integration of significant RE. The allocated US$20 million is a small fraction of STEG's expected recurrent expenditures for the categories that form part of the EEP. The capacity and independence of STEG's Inspection and Audit Office, which will act as the independent verification agent (IVA) and will ensure that DLIs are met before disbursements are authorized, is considered adequate.

[20] Where results are not achieved in a particular year, the allocated amount will be carried over to subsequent years. Where results were partially achieved in any year, the principle of scalability shall apply, that is, the pro rata DLI value attributable to the result achieved shall be disbursed, and the remaining amount carried over to subsequent years. Where targeted results are surpassed in any one year, the principle of scalability shall also apply, that is, the full value of the DLI, as well as the pro rata DLI value attributable to the surpassed result, will be disbursed.

Table 1: Summary of Disbursement-Linked Indicators

DLI	Baseline (2018)	Annual targets					Proposed allocation
		2019	2020	2021	2022	2023	USD ml.
1. HV and MV clients equipped with smart meters (%)	0	0	70%	100%			2
2. Large LV customers (monthly consumption above 1750 kWh) incorporated into the Revenue Protection Program	0	50% of clients >2500 kWh/month	100% of clients >2500 kWh/month	25% of clients <2500 kWh/month and >1750 kWh/month	50% of clients <2500 kWh/month and >1750 kWh/month	100% of clients <2500 kWh/month and >1750 kWh/month	5
3. Bill collection rate to non-government entities ($ collected from LV customers over a 4-month period /$ total billed over the same period)	92%	94%	97%	99%	99%	99%	10
4. LV meters are read using hand-held devices (%)	0	50%	90%	100%			2.5
5. Communication/outreach campaigns on customer rights and responsibilities addressing women's and men's needs	0	1 campaign	3 campaigns	3 campaigns			0.5

34. *Addressing gender gaps.* Component 2 aims to enhance women's voice and agency on energy-related services. The ESMAP TA carried out two gender-sensitive surveys on: (i) the public perception of the energy sector and subsidy reform; and (ii) STEG's quality of service among its customers. The results indicate that: (i) men seem to have more control than women over how energy is used and how the costs of energy are met within the household (only 26 percent of respondents declaring to be responsible for energy use and expenditure within the household are women); (ii) women seem to suffer from restrained access to information on energy services as they encounter more difficulties in understanding electricity bills (63 percent of men declare that they understand the bills, compared with 57 percent of women) and billing methods (52 percent of men, 48 of women); and (iii) women tend to be less informed on on-going energy sector reforms and their consequences (85 percent of women declare that they are unaware of the reforms, compared to 80 percent of men). As a result, women tend to have a worse overall perception of the energy sector compared to men (only 21 percent of women declare that they have a good perception of the energy sector, compared to 27 percent in the case of men), which may hinder their demand for, and access to, energy services.

35. *Gender-related actions.* Under DLI (v), the Project aims to reduce information gaps between women and men on energy-related services and promote equal participation in energy decisions, at public and household levels. While the Project will ensure a broad and equal participation of women and men through outreach activities to adequately meet their needs and preferences (different means of communication, appropriate wording and messages, etc.), the Project will specifically address the identified women's information gaps by conducting *ad hoc* sessions targeting women's groups and networks, and engaging with different organizations (i.e., NGOs, women's business organizations, etc.). The Project will also conduct a survey at the end to measure improvement in the share of female customers reporting increased awareness and knowledge of STEG services, customer rights and responsibilities. Improving women's knowledge on energy-related services (understanding of electricity bills and billing methods, and of available services including electronic enrollment, forms of payment and customer services support) will increase women's demand for and access to such

services and may contribute to achieve broader economic opportunities for women.[21] In addition, under DLI (iii), the Project will ensure flexibility in bill payment methods and improve customer experience by designing tools and practices that meet women's and men's needs and preferences. These actions are in line with Tunisia CPF's expected outcomes on gender (improve men's and women's access to public information and increase men's and women's participation in service delivery), with WBG Gender Strategy (enhancing women's voice and agency), and with the MENA Regional Update 2019 (Digital transformation: improve contestability in markets, including via disruptive technologies and digital payments).

36. *Gender-related indicator.* The Project will measure and report on (i) improvement in the share of female customers reporting awareness and knowledge of STEG services, customer rights and responsibilities; (ii) ratio of female to male customers using direct payment (terminal, mobile payments); and (iii) ratio of female to male customers enrolled in electronic billing service.

C. Project Beneficiaries

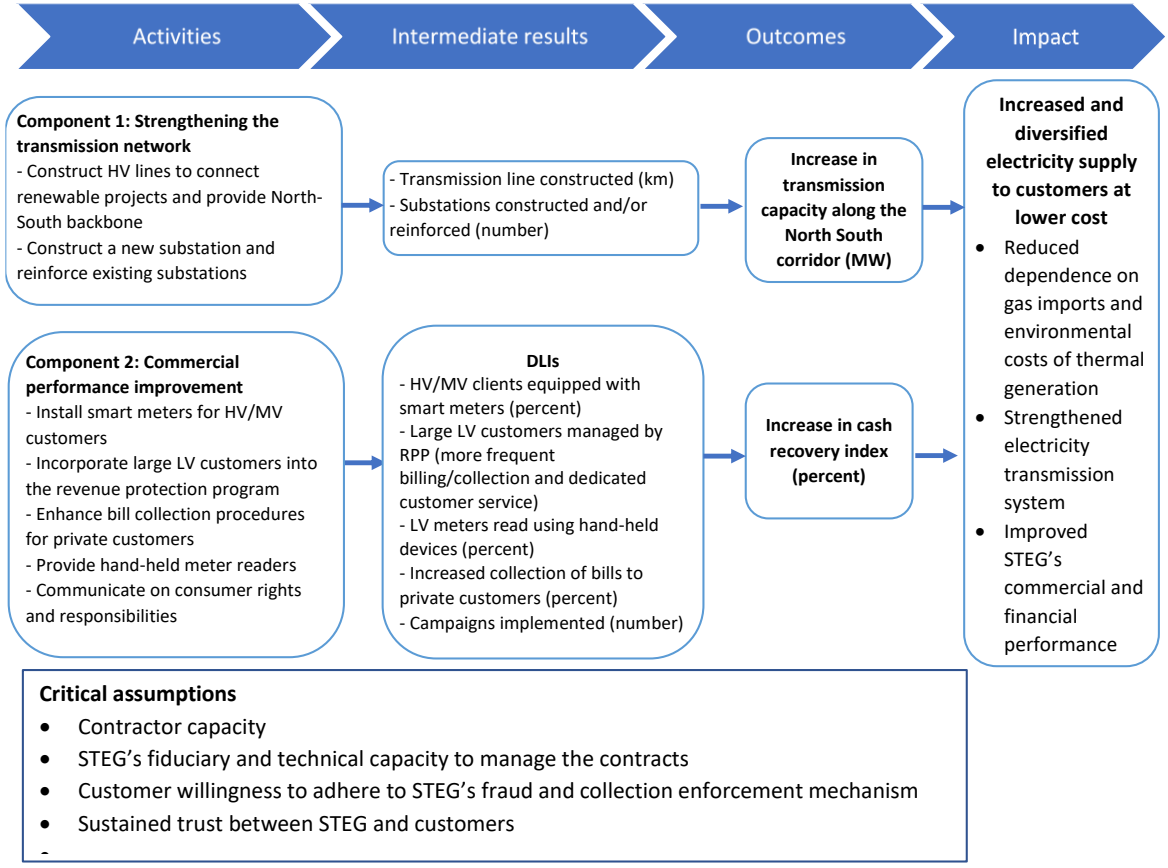
37. Direct project beneficiaries include all existing and prospective electricity customers in the country, who will benefit from more sustainable and cost-efficient electricity supply and better electricity service provision as Tunisia is able to diversify its energy sources and STEG's overall commercial performance improves. The cost of producing energy will decrease, lowering the pressure on prices charged to end-users. Large economic and social benefits will accrue to Tunisian society as a whole and will span across generations, as the sector is brought on a more sustainable footing, contributing to fiscal consolidation at the national level. The integration of RE generation capacity will reduce the carbon footprint of electricity generation in Tunisia, with environmental benefits spanning globally as the Project contributes to the global commitment to reduce GHG emissions.

[21] Getting to Gender Equality in Energy Infrastructure. Lessons from Electricity Generation, Transmission, and Distribution Projects. ESMAP, 2018.

D. Results Chain

38. The theory of change underpinning the proposed Project is capcuterd in the figure below.

Figure 1: Theory of change



E. Rationale for Bank Involvement and Role of Partners

39. **Transmission infrastructure is best financed through public resources to address market barriers that may prevent private investments in generation.** The transmission segment is by definition less suitable for private investment because of its typical features that resemble those of a monopoly market. In Tunisia's case, as vertically integrated public utility, STEG is solely responsible for the expansion of transmission capacity and access to Bank's financing is key to meet the needed investments. Private investment in generation is limited to only one IPP and the nascent nature of the RE market in Tunisia imposes additional risks on new entrants. Ensuring that privately-produced power can be readily dispatched constitutes a critical risk mitigation measure. Thus, the availability of a capable transmission network is a key to unlock private investment in generation; it will also improve the risk profile of IPP transactions and their bankability, which in return will result in better contractual terms to STEG and a fairer risk allocation.

40. **The World Bank has unique experience worldwide in middle-income countries supporting power sector reforms, utility performance improvement programs and electrification investments**. The added value of the Bank

derives from its ability to deploy a diversified and tailored energy sector program, working in coordination with the IFC to address the interrelated energy sector challenges in a coordinated manner. As highlighted above, the proposed Project is a part of the Bank's wider engagement, where policy dialogue, technical assistance, advisory services and lending are arranged in complementarity with one another to address key sector issues and the related effects along the value chain. Support to subsidy reform provides a clear example. The policy dialogue mainstreamed under the DPF tackles price distortions in the electricity market and was developed in coordination with the IMF. At the same time, the Project and ESMAP TA address the cost side of the equation; that is, they are geared towards reducing inefficiencies along the value chain by helping improve STEG's performance. On the other hand, analysis and technical support is deployed in sync by the DPF and the energy sector teams to help mitigate the effects of the subsidy reform and design effective safety net measures. The capacity to design and implement such integrated, sector-wide support programs gives the Bank a unique comparative advantage in addressing the multiple and complex challenges of countries such as Tunisia that are navigating through sector or economy-wide reforms.

41. **The Bank has global experience in the design and implementation of projects targeting utility performance improvements**. Over the past years, the Bank has developed a distinctive approach to help power utilities improve their commercial capacity and lift their financial standing through revenue protection programs (RPPs). RPPs have been deployed successfully in several countries and demonstrate the Bank's added value in designing fit-for-purpose, pragmatic yet impactful solutions to improve utility performance. The building blocks of an RPP, which were initially identified by the Bank, have been reflected into the SGP financed by AFD. The ESMAP TA will help define a turnkey plan to address STEG's performance weaknesses and establish a sustainable roadmap to achieve the targets agreed under the performance contract. This will provide a solid basis to anchor actions envisaged under the Project and consolidate its results.

42. **The Project builds on a close partnership with AFD.** As highlighted above, the proposed Project is a component of a larger program targeting the most important electricity sector challenges. The Project will build on equipment and practices established under SGP to push STEG to reach significant results in terms of revenue protection and commercial performance. The Project will therefore realize and maximize the impact of the combined support provided by AFD and the Bank.

F. Lessons Learned and Reflected in the Project Design

43. STEG has a long track record of implementing investments in grid infrastructure, and lessons from past experience have been incorporated in the design of the proposed Project. The key lessons are summarized below.

44. ***Streamlined procurement***. The recourse to *engineer-procure-construct* (EPC) contracts is a common and rational practice in the execution of large infrastructure investments and has been routinely used by STEG. Based on a network study completed in 2018, STEG has identified the optimum reinforcements to the HV system, including corridors for expansions and technical configurations. While these provide the needed technical specifications for launching the tendering process, the detail design will be left to contractors under the EPC. The routing within the corridor will be identified in line with the environmental and social impact assessment (ESIA) that will be conducted by an independent consulting firm, so as to minimize environmental and social impacts. The EPC option allows to streamline procurement activities to the extent possible, as opposed to separate contracts for works/supply/installation. Also, a minimum number of packages has been identified, including one EPC for transmission lines, which will comprise multiple lots, and one for substations. Procurement activities have been advanced to avoid implementation delays once the project becomes effective. The request for proposals for PV concessions were addressed to pre-qualified bidders on March 15, 2019.

45. ***State-of-the art practices for utility performance improvement.*** The scope of Component 2 of the Project reflects lessons learned from successful programs financed by the World Bank that supported the reengineering of competencies and practices at the utility level. As highlighted above, the Bank has extensive experience in the design of such programs, that are often implemented in conjunction with power sector reforms and include RPPs. A key lesson learned from such programs is that identifying and correctly billing large electricity customers is the most important action to improve the financial standing of a utility. Although they represent only a fraction of the customer base, these customers normally account for over half the sales. The redefinition of customer categories is captured in one of the DLIs; the metering of high-voltage and medium-voltage customers is captured in another DLI, while a third envisages the provision of hand-held devices to utility staff for more efficient meter reading. It is also important to increase the collection rate, where Tunisia has deteriorated significantly; this too is captured by the DLIs.

III. IMPLEMENTATION

A. Institutional and Implementation Arrangements

46. STEG, a public institution under the supervision of the Ministry of Industry with financial autonomy, will be the sole implementing agency of the proposed Project. The Transmission and Distribution departments of STEG will coordinate with other departments concerned on project management, including procurement, planning, technology, and security and environment. STEG will assign a dedicated internal Project Implementation Team (PIT) to manage the Project. PIT will comprise: (i) a Project Manager (PM), who will coordinate all project activities and will be the main counterpart of the Bank during project implementation; (ii) a Procurement Specialist; (iii) a Financial Management Specialist; (iv) an Accountant; (v) an Environmental Specialist; (vi) a Social Safeguards Specialist; and (vii) a Monitoring and Evaluation Specialist. In addition, STEG will reinforce PIT's capacity in terms of implementation and monitoring of the resettlement policy framework and action plans. The PM will rely on a number of engineers and technical specialists from the transmission, distribution and environment departments to draft technical specifications, evaluate technical proposals and monitor implementation of the EPC and other contracts, as well as studies. Implementation procedures for all fiduciary and safeguards aspects of the Project will be described in a Project Operations Manual (PIM) prepared by STEG and approved by the Bank. Any revisions to the PIM during implementation will need to be approved by the Bank.

47. Funds made available to the Project from IBRD will be channelled directly to STEG through a Loan Agreement (LA) entered into between STEG and the World Bank. The loan will be guaranteed by the GoT and a separate Guarantee Agreement will be entered into by the Republic of Tunisia and the Bank.

B. Results Monitoring and Evaluation Arrangements

48. Overall project monitoring and evaluation will be carried out at by STEG. The PM will be responsible for monitoring and evaluation and for preparing monthly progress reports for discussion by STEG's senior management. A M&E Officer may be assigned to support the PM. STEG's Inspection and Audit Office will verify the achievements of DLIs based on STEG's relevant reports.

49. Section VI presents the Project's results framework (RF), which defines specific outcomes and results to be monitored. The RF identifies outcome indicators (PDO Indicators) for the Project as a whole, and output indicators (Intermediate Result Indicators) for each project component. Annual target values for the result indicators have been

estimated based on the feasibility analysis completed by STEG and validated by the Bank. STEG will be responsible for collecting and collating information on project activities and for submitting progress reports to the Bank, on an annual basis for PDO indicators and on a semi-annual basis for intermediate indicators. In addition to regular monitoring and reporting on the agreed indicators, activities to be monitored include the timely, efficient, and transparent supervision of procurement and contract management; monitoring of construction and commissioning of works; and effective implementation of environmental and social safeguard instruments. STEG and the Bank will conduct a joint mid-term review; STEG will carry out its own evaluation of the Project at the end of implementation.

C. Sustainability

50. **The sustainability of the Project hinges on a predictable tariff setting regime, while adequate communication and social protection is provided to mitigate economic and social impacts.** The sustainability of Tunisia's energy sector is anchored in the stability, transparency and objectivity of the tariff regime, all key to end STEG's dependence on government subsidies, enable the utility to make investments in line with the growing demands of Tunisia's economy, and become a reliable partner of IPPs. The tariff adjustment process may encounter resistance as increases in electricity prices fuel social tensions. However, the GoT has so far demonstrated steady commitment to the subsidy reform.

51. **Project outcomes are strictly related to the success of the concession framework.** While only one of the transmission lines to be built under the Project is meant to connect a specific PV IPP to be awarded under the concession framework, the overall expansion of transmission capacity will have less meaning if all other IPPs are not developed in a timely and effective manner. The concession will be an important test of Tunisia's ability to attract and negotiate private sector participation in the power market. Adequate transaction support provided by the IFC and other partners will therefore be key for making projects bankable and attract world-class developers. The governance framework underpinning Tunisia's energy sector will need to be strengthened in line with the changing power market. The establishment of the Regulatory Authority will be key to address these challenges, and the ESMAP TA will provide critical support to equip the agency with the competencies needed to govern the transition towards a more open, transparent and efficient power market.

52. **Equally important is a continued focus on improving STEG's performance.** The new performance contract starting in 2020 will provide an ideal platform to continue and consolidate performance improvements at the utility level. The diagnosis being completed under the ESMAP TA will help define priority areas and related indicators on which efforts should be focused during the next contract period. The contract will build on the results and lessons learned from the implementation of SGP. As the performance contract will run in parallel to the Project, there will an incentive for STEG to complete project activities in a timely manner and build on results from the Project to achieve the identified performance targets.

IV. APPRAISAL SUMMARY

A. Technical Analysis

53. A technical assessment has been carried out to validate the design and scope of Component 1, as detailed in Annex 2. The assessment has confirmed that building a robust north-south transmission backbone (Skhira-Kondar and Skhira-Thyna transmission lines) constitutes a priority to connect load centers (mainly in the north) with areas with high energy resource potential where new generation sites are expected to be located. The proposed investments were

identified based on STEG's network studies[22], and the assessment found that they are required to reinforce the network and provide the needed wheeling capacity to evacuate all RE generation, including the PV plant to be connected under the Project and additional RE (wind and solar) generation in the South. Without the identified transmission lines, only 200 MW of the 800 MW of planned RE capacity to be developed under the concession framework could be evacuated; there will also be an increase in the transmission loss of 10 percent. Thus, the proposed investments are justified to avoid curtailment of new RE generation, especially concerning IPPs (which are likely to enter into *take or pay* contracts with STEG). Overall, not only will these investments enable the shift towards more efficient and sustainable sources of energy generation as significant RE enters Tunisia's energy mix; they will also improve the flexibility of the national power system, enabling the optimization of electricity production and dispatch, as well as system reliability and grid stability. The new transmission lines and substations will allow the blending of different energy resources and mobilize them as needed, depending on their characteristics and in line with demand curves. Additional gas capacity connected to the network will compensate for the intermittency of the significant RE soon to be integrated into Tunisia's power system, and will help improve system reliability and grid stability by providing spinning reserve that will contribute to frequency regulation. In addition, the new Skhira-Kondar transmission line will reinforce Tunisia's network in view of its participation in power trade with neighboring Maghreb countries and with Europe once the Elmed Interconnector is constructed; see Annex 2 for more details. Investments under Component 1 will complement additions in terms of sub-stations, above-ground and underground transmission lines in various locations to be financed by the IsDB and AfDB. As some of this infrastructure must interface, STEG will need to ensure close coordination between projects funded by all three partners.

54. The technical configuration of the transmission lines and substations (400 kV and 225 kV alternating current) relies on well-established technologies and presents no unusual construction and/or operational challenges. These technologies and the related equipment are routinely used in the region. Technical parameters and estimated costs for the transmission lines were defined by STEG based on network system analyses with load flow and dynamic simulations. Different scenarios were simulated and analyzed to define the optimal configuration to reinforce STEG's HV network and provide the wheeling capacity needed to integrate the planned generation capacity additions. Cost estimations for both transmission line extensions and substation reinforcement/construction were based on prices derived from contracts executed by STEG under its investment plan for 2012-2014 and adjusted for inflation. As part of the technical assessment, the cost estimates were validated through benchmarking. The Cost Benchmark Tool (CBT) developed by Fichtner and financed by the World Bank was used to validate transmission line costs. For substations, the estimated costs were benchmarked against similar projects. Unallocated funding set aside under Component 1 will provide a cushion against unforeseen price and technical contingencies that may affect project costs.

B. Economic and Financial Analysis

(i) Economic analysis

55. The economic analysis of Component 1 considers not only the transmission investment but also the costs and benefits of the additional (RE and thermal) generation from the South that will be evacuated by the new transmission lines.[23] The 20-year net present value (NPV) of the component at a 10 percent discount rate is US$112 million, and the project investments for the transmission lines and substations account for only 1 percent of the total cost (when electricity

[22] Study to reinforce the STEG's Network Southern Transmission - Horizon 2023, published in September 2018 and the Summary Report of the Connection Study of Renewable Power Plants under the 800 MW concession scheme, published on July 15, 2018.
[23] This includes 1250 MW of RE by 2025 and around 820 MW of RE between 2026-2030.

generation and distribution costs are included).[24] The economic internal rate of return (EIRR) before environmental benefits is 14.7 percent, and 39.2 percent if environmental benefits are included (Table 2).[25] The main benefits are derived from the evacuation of additional RE capacity to meet growing demand[26] and replace thermal generation and, to a limited extent, avoidance of increase in transmission losses as large additional generation capacity and energy supply are added to the network by 2030. The benefits also include the increased security of supply through diversification of the fuel mix and reduced exposure to international fuel price; these are, however, not quantified. Sensitivity analysis was carried out with regards to: (i) increase in transmission losses in the absence of transmission investment; (ii) delays in completion of the transmission lines; (iii) cost escalation for the transmission investment; (iv) cost of RE generation; and (v) change in discount rate. The EIRR does not change significantly even if there is no increase in transmission loss. The returns are robust to some variations in implementation delay (up to 2025) and the cost of transmission lines (up to US$250 million) and to significant increases in the costs of solar and wind. The component remains viable even if the cost of gas decreases in relations to RE. The component is economically unviable if the discount rate is higher than 15 percent, but this is unlikely given the current low economic growth in Tunisia.

Table 2: Economic Analysis of Component 1 – Summary of Results

		no project	with project	*net economic returns*
Discount rate	[ ]			10.0%
Economic rate of return				
ERR	[ ]			14.7%
ERR+local+GHG@BankGuidanceValues	[ ]			39.2%
Composition of NPV				
Costs				
Project capital cost	[$USm]		-102.1	-102.1
Project O&M	[$USm]		-20.1	-20.1
Project generation	[$USm]		-263.1	-263.1
Costs (outside boundary)				
Generation cost	[$USm]	-9281.3	-8950.2	331.0
Distribution cost	[$USm]	-1813.6	-1837.8	-24.1
Total costs	[$USm]	**-11094.9**	**-11173.3**	**-78.4**
Benefits				
Consumer benefits, grid	[$USm]	14288.8	14479.1	190.2
total benefits	[$USm]	**14288.8**	**14479.1**	**190.2**
NPV (before environmental benefits)	**[$USm]**	**3193.9**	**3305.8**	**111.9**
NPV (including environment)	**[$USm]**	**-2282.4**	**-1732.4**	**550.1**
Lifetime GHG emissions	[1000tons]	232520	214736	-17785

[24] The annual O&M costs of the lines and substations were taken as 2% of the capital cost. The economic costs of the project also include the costs of generating and delivering electricity. The former is estimated at the LCOE of US$0.061/kWh for solar, $0.059/kWh for wind, and US$0.044kWh for thermal (UNDP. Tunisia: Derisking Renewable Energy Investment 2018). The latter is assumed to be the current variable non-fuel cost of STEG.

[25] The environmental benefits are computed as the total avoided social cost of carbon due to reduction of GHG emissions from reduced gas-based generation at the baseline emission factor of 0.374 tCO2e/kWh (at 54% plant efficiency). The avoided social cost of GHG emissions is estimated based on conservative social cost of carbon at US$35/tCO2 starting in 2019 and gradually increasing at 2.25%/year throughout the evaluation period (Guidance note on shadow price of carbon in economic analysis, November 12, 2017).

[26] The baseline assumption for consumer surplus or willingness to pay (WTP) is the actual tariff (around US$0.077/kWh), which is a conservative estimate. The economic benefit enjoyed by pilferers is likely to be lower than that of paying customers and is assumed at half that of paying consumers.

56. Calculated on the basis of activities financed by the Bank, as well as the complementary SGP financed by AFD, the EIRR of Component 2 is 36.6 percent before environmental benefits. The main benefits derive from the reduction of non-technical and collection losses, which will curtail the demand of the pilferers[27] and help improve STEG's finances, hence reduce the subsidy requirement from the GoT. The Project investment of US$20 million for this component is included in the larger cost of delivering the result but is not the full cost. The total cost includes the cost of electricity supply and the additional cost of the RPP and the smart meters provided to the HV/MV customers; the latter is financed by AFD under the SGP. The NPV of economic benefits is US$62 million before environmental benefits. This increases to US$161 million once benefits derived from the reduction of thermal generation (based on lower demand by the pilferers) and the reduced local air pollution and GHG emissions are considered (Table 3). Sensitivity analysis was carried out to consider variations relative to base case assumptions on: (i) loss reduction targets; (ii) curtailed consumption; and (iii) discount rate. Component 2 is relatively robust to investment cost overruns and implementation delays. It is economically viable even if commercial losses are reduced by only 1.6 percentage points. In case there is no reduction of collection losses, commercial losses would need to reach at least 3.3 percentage points for the Project to be economically viable. Vice versa, if there is no reduction of commercial losses, collection losses should decrease by at least 4 percentage points.

Table 3: Economic Analysis of Component 2 – Summary of Results

		no project	with project	*net economic returns*
Discount rate	[ ]			10.0%
Economic rate of return				
ERR				36.6%
ERR+local+GHG@BankGuidanceValues	[ ]			68.3%
Composition of NPV				
Costs				
Investment – AFD	[$USm]		-17.5	-17.5
Investment – WB	[$USm]		-16.0	-16.0
subsidy requirement	[$USm]	-2668.6	-2280.8	387.8
Total costs	[$USm]	**-2668.6**	**-2314.3**	**354.3**
Benefits				
paying consumer benefits	[$USm]	8816.7	9109.3	292.6
pilferer benefits	[$USm]	956.7	664.1	-292.6
total benefits	[$USm]	**9773.4**	**9773.4**	**0.0**
NPV (before environmental benefits)	**[$USm]**	**956.7**	**1018.4**	**61.7**
NPV (including environment)	**[$USm]**	**956.7**	**1117.4**	**160.7**
Lifetime GHG emissions	[1000tons]		-3012	-3012

(ii) Financial Analysis

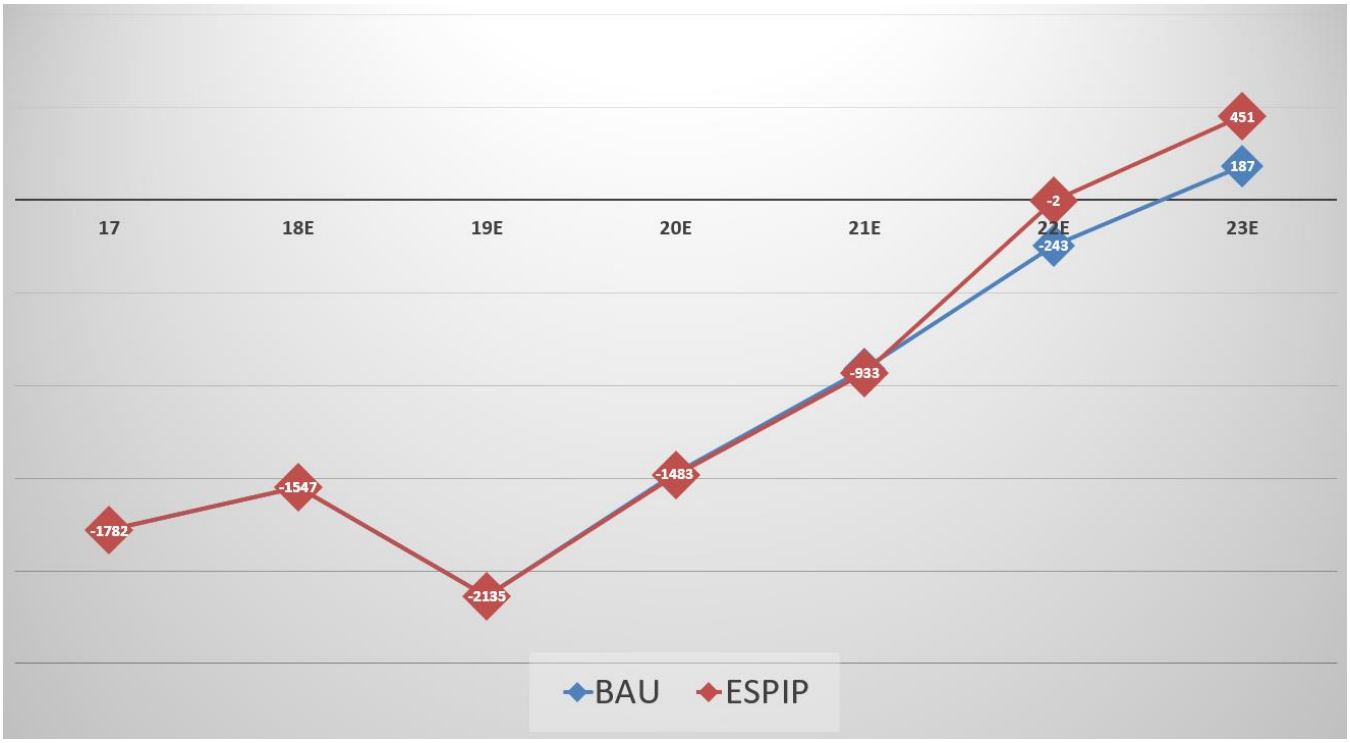
57. **The Project is expected to have a positive impact on STEG's financial sustainability**. STEG's financial health is expected to be partially restored through a number of positive externalities of the Project such as: (i) lower commercial

[27] It is assumed that only 50 percent of previously unbilled/ unpaid consumption is taken up (since the pilferers will curtail their consumption when being charged), so this also results in a reduction of thermal generation of an equivalent amount.

losses; (ii) lower collection losses; (iii) stabilized technical losses despite the growing transmission network; and (iv) lower generation cost and increased hedging against international oil market volatility with a higher penetration of renewable energies. These are expected to translate in lower subsidies required from the GoT and progressive full cost recovery for future STEG financial self-sustainability. Starting in 2023, the Project would contribute to an average annual net financial benefit to STEG estimated between US$60 million and US$90 million.

58. **STEG's financial health could be fully restored with the support of ESIP, coupled with tariff reform to achieve cost recovery.** STEG's financial health can be restored by 2022 under the following conditions: (i) success of the ESIP and the smart meter program, focused on operational efficiency; (ii) technical support to the GoT to successfully implement the much-needed tariff reform[28]; and (iii) a contained currency devaluation at the macroeconomic level. This could lead to a positive net result of up to TND450 million by 2023 vs. TND187 million under a business as usual scenario (Figure 2).

Figure 2: STEG's Net Result Forecast (in TND million) - Full Cost Recovery



C. Fiduciary

(i) Financial Management

59. A Financial Management Assessment (FMA) was carried out in accordance with the World Bank Policy on Investment Project Financing to evaluate STEG's financial management (FM) capacity and the adequacy of the FM

[28] The model assumes progressive electricity and gas tariff increase over three consecutive years (2020, 2021 and 2022) to achieve full cost recovery by 2022 (respectively 9% and 20% per year).

arrangements put in place for the implementation of the Project. The detailed assessment is presented in Annex 1 and is summarized below**.**

60. **Risk assessment.** STEG has a long operational track record and adequate financial management arrangements. It has implemented a wide range of energy infrastructure projects funded by a variety of donors (i.e., AfDB, AFD, EBRD, EIB, JICA and KFW); however, it has no prior experience with World Bank procedures and fiduciary requirements. The financial reporting system requires improvement, as highlighted in the external audit report. The financial statements are based on a mix local accounting standards and the international financial reporting standards (IFRS).

61. **Mitigation measures.** The following measures have been agreed to mitigate the identified risks and weaknesses:

- Elaboration of financial statements based on national accounting standards and support for upgrading the information system to enable the transition to international financial reporting standards;
- Development of a detailed PIM describing the roles and responsibilities of the departments involved and the financial management procedures; and
- Provision of training on World Bank fiduciary procedures (i.e., procurement, financial management and disbursements) to the PIT Financial Management Specialist (FMS).

62. **Financial Management arrangements.** STEG will be responsible for the overall financial management of the Project. STEG will rely on its Financial Directorate, which will assign an FMS to the PIT. Roles, responsibilities and procedures for financial management will be described in the PIM. Project activities will be annually budgeted in STEG's budget and will be subject to the World Bank's no-objection. The PIT will maintain a separate accounting book using STEG's current financial information management systems. A Designated Account for investments under Component 1 will be opened at the Central Bank of Tunisia and a dedicated account for disbursements for EPP will be established by STEG at a Commercial Bank acceptable to the Bank. Interim Financial Reports will be produced separately and submitted to the World Bank no later than 45 days after the end of the semester. STEG's external audit arrangement will be applied to the Project. STEG's external auditor will produce a separate audit report on the Project's activities, which will be submitted no later than six months after the end of each fiscal year.

(ii) Procurement

63. Project procurement will be carried out by STEG. STEG's capacity was assessed based on the Bank's knowledge of: (i) STEG's procurement activities carried out under the *Tunisia-Italy Power Interconnector - Project Preparation TA (P164625)*; and (ii) STEG's procurement experience under similar MDB-funded projects. STEG has staff with good experience in procurement management under projects financed by multilateral and bilateral financiers, including projects funded by the AfDB and the IsDB. This staff is responsible for all procurement processing, from the preparation of bidding documents to the notification to the consultant/supplier/contractor, and for record keeping. The assessment identified the following risks: (i) difficulties may be encountered by STEG in handling the volume of procurement under the Project; and (ii) duplication between national and Bank procurement procedures, and a slow, cumbersome and bureaucratic procurement prior review by the national procurement oversight bodies.

64. **Mitigation measures**. The following measures have been agreed and/or have been implemented to mitigate the identified risks: (i) training to the PIT on World Bank procurement regulations and on the Bank's standard procurement documents, especially for supply and installation contracts; and (ii) ensuring that the Project Procurement Strategy for Development (PPSD) prepared by STEG clearly describes how procurement operations will be carried out in an optimized manner to support the development objectives of the Project and to deliver value for money.

65. **Procurement arrangements**. Procurement for the Project will be carried out in accordance with the World Bank's Procurement Regulations for IPF Borrowers (Regulations), July 2016 edition, revised in November 2017, and August 2018, and the provisions stipulated in the Legal Agreement. The Project will be subject to the Bank's Anticorruption Guidelines ('Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants'), dated October 15, 2006, and revised in January 2011 and July 2016.

66. **Procurement profile.** Activities/inputs to be procured under the Project consist mainly of design, supply and equipment of electricity transmission network infrastructure under *Component 1-Development of the electricity transmission network infrastructure (US$131 million).* Infrastructure works will include: (i) construction of 384 km of high-voltage (HV) transmission lines, including 192 km of 400 kV double-circuit lines and 192 km of 225 kV single circuit lines; (ii) construction of a 400/225 kV substation associated with the Skhira plant; and (iii) reinforcements of existing substations at Thyna (225/150 kV) and Tataouine (225 kV) through the installation of new lie bays and/or transformers.

67. **Procurement Strategy for Development (PPSD).** The PPSD has been drafted in accordance with the Bank's Regulations and the initial procurement plan for the 18 first months of the Project has been prepared based on the analysis and the outcomes of the PPSD. This initial Procurement Plan is subject to the Bank's no-objection. The Plan will be updated periodically to reflect needs and changing circumstances. Updates to the Procurement Plan will be submitted to the Bank for review and no-objection. Any changes to the Procurement Pan will be justified, as appropriate, by the Borrower through a revised PPSD. STEG will use STEP, an online system that will help plan and track procurement activities under the Project.

D. Safeguards

(i) Environmental Safeguards

68. The proposed Project triggers World Bank's Operation Policy on Environmental Assessment (OP 4.01). Given that its effects are expected to be limited, reversible, and easily controllable, the Project is classified as Environmental Category B (partial assessment). The main risks and impacts that are likely to result from the Project are linked to Component 1: the design, construction and operation phases of transmission HV lines will generate adverse negative impacts, if they are not mitigated correctly.

69. As the final route of the HV lines will be defined by contractors upon detailed technical design analysis, the Project has been authorized to use a framework approach. An Environmental and Social Management Framework (ESMF) has been prepared by STEG. A full Environmental and Social Impact Assessment (ESIA) and an Environmental and Social Management Plan (ESMP) will be prepared once the Project locations are known and ahead of any civil works; a full ESIA will also be prepared by the Ministry of Industry for the Borj Bourguiba associated plant with EBRD funding. The ESMF incorporates results from a scoping study completed by STEG, and describes the general natural, physical and socio-economic environment that may be impacted by the Project. It also builds on a scoping study prepared with funding from EBRD covering the areas likely to be impacted by Borj Bourguiba IPP, which is considered as associated infrastructure to this Project.

70. The ESMF confirmed that the main potential negative risks and impacts under Component 1 are related to occupational and community health and safety during the construction phase; waste generation management; soil erosion and sediment control from material sourcing areas and site preparation activities; fugitive dust and other emissions (SF6) and noise from heavy equipment; truck traffic and potential generation of hazardous materials and oil spills associated with heavy equipment operation and fueling activities. Negative environmental impacts also include terrestrial and

aquatic habitat alteration (especially bird life), generation of electrical and magnetic fields, management of hazardous materials, and risks to air traffic during the operation and maintenance phase. Positive impacts are mainly related to the reduction of GHG emissions as thermal electricity generation is displaced by renewables-based generation.

71. The Project triggers OP 4.04 for Natural Habitats. The scoping study confirmed that some sections of the preliminary routes identified for the transmission lines to be constructed under the Project are quite close to some protected wetlands and RAMSAR-classified sites, although they do not encroach directly on these areas. These negative impacts can affect bird life and arise especially during bird migration. The ESMF identified measures to be included in the ESIA/ESMP to mitigate such impacts. The scoping report also makes recommendations concerning the selection of the final route of transmission lines in a manner to avoid negative effects on bird migration areas as much as possible.

72. The scoping study confirmed that there are no archaeological sites and classified historical monuments in the areas that may be crossed by the transmission lines or where substations are to be located. The ESMF has proposed that a chance find procedure be included in the ESIA/ESMP. Other risks and impacts are linked to the PV plant (at Borj Bourguiba) associated with the Project, to be built and operated under a concession contract with the private sector. The scoping study prepared with EBRD funding classified the PV plant project as environmental risk Category B. Terms of reference (ToRs) for the ESIA for this plant have been prepared in line with: (i) national legislation; (ii) EBRD environmental and social sustainability policies and performance requirements; (iii) IFC's Environmental and Social Sustainability Policies and Performance Standards; and (iv) Environmental and Health Safety (EHS) Guidelines of the World Bank Group.

73. ***The ESMF has been reviewed, approved and disclosed in country on STEG's website on April 19, 2019 and on the World Bank external website on April 22, 2019***.

(ii) Social safeguards

74. The Project triggers OP 4.12 on Involuntary Resettlement, as activities under Component 1 will impact land, agricultural assets and livelihoods. The indicative corridors identified for the transmission lines go through eleven delegations across five governorates. The corridor areas are not densely populated, and land use is primarily for agriculture, arboriculture and livestock farming. Although the Project is not expected to generate physical displacement, as the indicative corridors avoid settlements, it will result in economic impacts related to the loss of crops and trees, as well as permanent but limited impacts on land, both public and private, for the sites of the tower footings and the new Kondar substation. The Project will also result in restriction of land access and use. Given the above, the overall involuntary resettlement impacts are expected to be moderate.

75. As the exact routings of the transmission lines are yet to be finalized, a Resettlement Policy Framework (RPF) has been prepared by STEG. The RPF outlines the key principles, requirements, mitigation measures, procedures, consultation processes, implementation arrangements and monitoring mechanisms to manage these impacts in line with OP 4.12. Site and corridor-specific Resettlement Plans (RPs) will be prepared along with the finalization of the detailed routings and submitted to the Bank for review and clearance.

76. As outlined in the ESMF and scoping study, labor influx is not expected to be significant, given the low volume of the incoming workforce (estimated to range between 60 to 140 workers) who will be working across the various corridors. Impacts related to labor influx are thus expected to be small-scale and temporary. However, the risks of communicable diseases, gender-based violence (GBV), illicit behavior and tensions with the local communities cannot be entirely excluded. To address these risks, the ESMF recommends an impact assessment of labor influx, including GBV, in the terms of reference of the site-specific environmental and social impacts assessments and the requirement to propose mitigation measures as necessary. Provisions will be included in the bidding and contractual documents to ensure that the civil works

comply with core labor standards, environmental and social considerations, and that the contractors will put in place a code of conduct for their management and labor force.

77. STEG's strong existing safety procedures to reduce the risk of accidents and electrocution of its labor force and local communities will be strengthened through the implementation of the ESMF. In addition, a sensitization and information campaign about these risks will be conducted during construction and prior to operation to raise awareness among community residents.

78. ***The RPF was disclosed along with the ESMF, in country on STEG's website on April 19, 2019 and on the World Bank external website on April 22, 2019***.

(iii) Management of social and environmental impacts mitigation measures

79. Activities to be financed by the Project will follow the steps of the environmental and social screening process through the completion of an Environmental and Social Diagnostic Fact Sheet (FDES). This takes into account the nature of the various sub-projects (activities), the locations involved and the extent of negative environmental and social impacts to be likely generated. A checklist has been developed screening out all Category A sub-projects that may: (i) significantly affect natural habitats or impact forests and rangelands; (ii) involve use of pesticides or other related products; (iii) damage existing physical cultural heritage; and (iv) traverse densely populated areas. **Only category B sub-projects will be selected** and, according to the sorting results, one of the following instruments will be prepared: (i) ESIA for the construction of transmission lines and conversion substations; and (ii) ESMP for the upgrading of existing substations.

80. The site-specific ESIAs/ESMPs and RPs will be prepared by specialized firms and will be reviewed, monitored and supervised by STEG; they will be submitted to the Bank for review and clearance. These documents will be elaborated in consultation with key local stakeholders and will be published and posted on STEG's website and the World Bank's external website prior to the commencement of any civil work. Mitigation measures identified in these safeguard instruments will be included in the Terms and Specifications documents (Cahiers des charges) for operators and entrepreneurs.

(iv) STEG's institutional capacity for management of environmental and social issues

81. An Environmental Specialist and a Social Safeguard Specialist will be part of the internal PIT to be set up by STEG. STEG's Safety and Environment Directorate will also be fully involved in the management of environmental and social aspects associated with the Project. This is the body that sets the utility's policies on safety and environmental protection; monitors their application and compliance with the relevant legal and regulatory provisions; provides advice and training on these matters and monitors the performance of operational units. The Directorate will be responsible for overseeing the implementation of environmental and social safeguards under the Project, organizing public consultations, and for reporting to the Bank.

82. STEG will appoint focal points in the departments/units involved with the Project, including: (i) the Central Directorate of Equipment, to ensure that contracts integrate environmental and social risk mitigation measures in compliance with ESMPs; (ii) the Central Directorate of Electricity Transmission and the Central Directorate of Electricity Generation, to ensure safeguards compliance during operation and maintenance of assets. Training on ESIA/ESMP and RP review and implementation, information and public consultations, handling complaints and social conflicts and reporting will be provided to the identified focal points.

(v) Monitoring and reporting arrangements

83. The PIT will set up an internal system to monitor the implementation of RPs, ESMPs and information and consultation activities. ToRs for engineering services to be procured by STEG for project implementation support will also include tasks related to ESMP and RPs monitoring. The Bank will assess the progress of safeguard activities during review missions. The PIT will provide semi-annual reports on the implementation of resettlement activities.

(vi) Consultations and Citizen Engagement

84. During the preparation of the safeguard documents, consultations were conducted with local residents and officials in all areas potentially affected by the Project. In addition, a public meeting for consultations on the ESMF, RPF and the scoping study was held in STEG's Headquarters on March 6th, 2019 and was attended by about thirty representatives and local officials from the project-affected areas. The ESMF has been finalized based on comments received during such consultations. A key requirement of the ESMF is to conduct an information and consultation process throughout the preparation of site-specific documents and construction activities. This will include: (i) a community health and safety awareness campaign; (ii) information and consultations about involuntary resettlement impacts, and payment procedures for compensation; and (iii) dissemination of contact details/procedures related to the grievance redress mechanisms both at the local and central level.

85. Under the supervision and coordination of the PIT, local grievance redress mechanisms will be established, with simple, transparent and effective procedures for handling complaints related to resettlement and overall activities. The complaint register will be consolidated at the central level and will be monitored regularly. Details of its implementation will be provided in the progress reports submitted to the Bank.

86. Under Component 2 (Commercial performance improvement) STEG will conduct a series of public consultations across different customer types in representative regions within the first half of the project (by 2021) to seek feedback on STEG's processes of fraud and payment enforcement, and on the effectiveness of its efforts to shift customer and citizen perceptions. The feedback from customers will be taken into account when implementing project activities to ensure clients' views are reflected, particularly their perceived equity of the processes, and will contribute to STEG's commercial performance improvement. To monitor the citizen engagement feedback mechanism and improvement of customer satisfaction, STEG will conduct a customer survey within the project. The baseline (the 2015 customer satisfaction survey) indicates a global index of client satisfaction of 5.3 (out of 10) on all of STEG's electricity processes.[29] The parallel TA also conducted a customer survey in 2018 on specific commercial and customer service processes, and identified areas for improvement, including mechanisms for disconnection, payment, and addressing customer complaints. The TA is supporting STEG to prepare an action plan to address the identified issues; this is expected to be incorporated in STEG's subsequent performance contract, when the current contract (for 2016-2020) is completed.

(vii) Grievance Redress Mechanisms

87. Communities and individuals who believe that they are adversely affected by a World Bank (WB) supported project may submit complaints to existing project-level grievance redress mechanisms or the WB's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the WB's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of WB non-compliance with its policies and

[29] The survey asked customers to rate their satisfaction on all STEG's electricity processes, from production to transmission, distribution, commercial, and customer service from 1 to 10 (10 being most satisfied). The global index of client satisfaction is calculated as the average of all the responses from all customers.

procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank's corporate Grievance Redress Service (GRS), please visit *http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service*. For information on how to submit complaints to the World Bank Inspection Panel, please visit *www.inspectionpanel.org*.

V. KEY RISKS

88. The overall risk to achieving the PDO is expected to be substantial (see the SORT table in the Data Sheet). The following key risks facing the proposed Project and the measures to mitigate them are discussed below.

89. **Political and Governance (Substantial).** The current coalition government supports the proposed Project. However, the effectiveness of the coalition government will be severely tested if the economic and social situation degrades further before the presidential and parliamentary elections in late 2019. Nonetheless, there is broad based consensus across the political spectrum about the importance of developing Tunisia's RE potential and the proposed Project is essential to achieving that goal.

90. **Macroeconomic (Substantial).** The macroeconomic situation has deteriorated since the 2011 revolution and, despite some improvements, remains very fragile. Two key macroeconomic variables, the international price of oil and the exchange rate of the local currency vs. USD, have a major impact on STEG's cost of supply. Since the GoT does not always reflect fluctuations in those variables on end-user prices or fully compensate STEG through subsidies, this can have a negative impact on STEG's financial performance[30]. Conversely, since subsidy accounts for a large share of the fiscal deficit and gas imports represent a significant proportion of the current account deficit, STEG's financial performance has a significant impact on the macro-fiscal situation. The GoT is mitigating the impact of oil price fluctuations on its budget through a partial hedge instrument for 2019 that was structured with the help of the Bank Treasury Department. Furthermore, the risk to STEG's financial recovery is being addressed on the cost side by this operation and on the revenue side by the Government's energy and fiscal policy. Increasing the RE share will reduce STEG's exposure to gas imports and reducing STEG's commercial and collection losses will not only reduce cost but also improve STEG's cash flow. On the revenue side, the Government's commitment to eliminate subsidies by 2022 and eventually indexing energy prices to cost fluctuations, supported by the Bank TA, is helping to recover STEG's financial viability and reduce macroeconomic risks to STEG's financial performance. Electricity prices were adjusted three times in 2018 and had important fiscal impact by reducing the subsidy bill. The GoT is expected to increase prices further in 2019, accompanied by social safety nets to protect the poor and vulnerable, supporting measures for firms, and a communication campaign to build social consensus around reform. The GoT is committed to fiscal consolidation and macroeconomic stability, including through the IMF EFF program. This program provides a strong policy anchor for macroeconomic stability, and continued monitoring is critical to ensure robust implementation. Ongoing collaboration between the Bank's Energy and Country Economics teams and the IMF is assessing the impact of these measures on the economy, fiscal deficit, and the current account. Finally, a non-

[30] For each increase of US$1 in the Brent price, STEG's financial deficit is expected to increase by TND52 million (approximately US$17 million at current exchange rate); and for each depreciation by TND0.1 per US$ (3 percent), STEG's financial deficit is expected to increase by TND121 million (approximately US$40 million).

financed policy matrix being developed by the Bank and development partners will enable monitoring of the linkage between critical macro-fiscal reforms and STEG's commercial performance.

91. **Sector strategies and policies (Substantial).** The GoT is committed to reforming subsidies to the energy sector, improving STEG's performance, and boosting the share of RE in the overall generation mix. The request for this Project came from STEG and the GoT, through the Ministry of Development, Investment and International Cooperation, which indicates political ownership. Nevertheless, given the upcoming presidential and parliamentary election in late 2019, there is a risk that government priorities for the energy sector may change. However, given the Project's strong focus on enabling RE integration into STEG's system, for which there is broad-based consensus, that risk is mitigated.

92. **Environmental and social (Substantial).** The environmental risk of the Project is rated as substantial because potential locations of the transmission line alignments would be close to sensitive natural habitats, with potential impact to migratory bird routes. The ESIAs to be prepared for the lines will develop specific measures to mitigate impacts/risks on birdlife. Additional risks include occupational and community health and safety; solid and liquid waste management; soil erosion and possible terrestrial and aquatic habitat alteration; generation of electrical and magnetic fields; gas leaks and management of hazardous materials. Exogenous environmental risks, as related to extreme events such as heat waves and flooding, as well as to droughts and sea-level rise, could adversely affect the achievement of the operation's objectives or the sustainability of results. These risks could be less diverse or complex and, although predictable, they remain beyond the direct control of the operation.

93. Social risks are related to land acquisition necessary for the transmission lines and the associated involuntary resettlement. Most impacts are temporary in nature (loss of crops, trees and livelihoods) or relate to restriction of access. The indicative corridors identified for the transmission lines will avoid settlements. There will be permanent loss of some land where transmission towers will be positioned. Given the above, the overall involuntary resettlement impacts are expected to be moderate. Other social risks relate to community health and safety, stakeholder buy-in and labor influx, which are expected to be moderate, as activities are spread around a wide geographical area. The ESMF and RPF provide sound principles and procedures for risk mitigation in line with the relevant Bank's policies. The ESMF also includes the implementation of an information and consultation strategy and a community awareness campaign when site-specific safeguard documents are prepared, and construction activities undertaken. STEG's Safety and Environment Directorate will oversee the management of environmental and social aspects associated with the Project, and Environmental and Social Specialists will be appointed to the PIT. Moreover, a consultant experienced with World Bank safeguard policies will support the PIT with the implementation of the RPF and RPs.

VI. RESULTS FRAMEWORK

Results Framework
COUNTRY: Tunisia
Energy Sector Improvement Project

Project Development Objectives(s)

The Project Development Objective (PDO) is to: (i) strengthen Tunisia's electricity transmission system; and (ii) improve STEG's commercial performance.

Project Development Objective Indicators

Indicator Name	DLI	Baseline	End Target
Strengthened Tunisia's electricity transmission system			
Increased transmission capacity along the South-North corridor (Megawatt)		721.00	3,090.00
Improved commercial performance of STEG			
Increase in cash recovery index (Percentage)		83.00	92.00

Intermediate Results Indicators by Components

Indicator Name	DLI	Baseline	End Target
1. Strengthening the electricity transmission network			
Transmission lines constructed under the projects (Kilometers)		0.00	384.00

Indicator Name	DLI	Baseline	End Target
Substations constructed and/or reinforced (Number)		0.00	3.00
2. Improving STEG's commercial performance			
High and medium voltage customers having smart meters installed (Percentage)	DLI 1	0.00	100.00
Large low voltage customers included in the revenue protection program (Percentage)	DLI 2	0.00	100.00
Bill collection of private customers (Percentage)	DLI 3	92.00	99.00
Low voltage meters read remotely or with handheld devices (Percentage)	DLI 4	0.00	100.00
Communication/outreach campaigns on customer rights and responsibilities (Number)	DLI 5	0.00	7.00
Ratio of female to male customers using electronic payment (Number)		0.65	0.85
Share of customers aware of STEG's performance improvement effort (Percentage)		14.10	30.00
Share of female customers aware of STEG's performance improvement effort (Percentage)		12.50	30.00
The results of the consumer feedback sessions and the customer satisfaction survey, and STEG responses, are published (Yes/No)		No	Yes

Monitoring & Evaluation Plan: PDO Indicators

Indicator Name	Definition/Description	Frequency	Datasource	Methodology for Data Collection	Responsibility for Data Collection
Increased transmission capacity along the South-North corridor	Aggregate transmission capacity of the Skhira-	Once	STEG	STEG report	STEG

	Kondar and Skhira-Thyna lines				
Increase in cash recovery index	The cash recovery index is defined as the billing efficiency (ratio of energy billed over energy consumed) multiplied by the collection efficiency (ratio of consumer bills paid over total consumer bills).	Annual	STEG	STEG annual reports	STEG

Monitoring & Evaluation Plan: Intermediate Results Indicators					
Indicator Name	**Definition/Description**	**Frequency**	**Datasource**	**Methodology for Data Collection**	**Responsibility for Data Collection**
Transmission lines constructed under the projects	Transmission lines constructed include 400 kV (192 km) and 225 kV (192 km)	Once	STEG	STEG report	STEG
Substations constructed and/or reinforced	1 new substation (Kondar) and 2 reinforced substations (Thyna and Tataouine)	Once	STEG	STEG report	STEG
High and medium voltage customers having smart meters installed		Annual	STEG	STEG report	STEG
Large low voltage customers included in the revenue protection program	Percent of large low voltage customers (consuming more than 1750 kWh per month) classified as "large customers" and are included in the revenue protection program, which means they	Annual	STEG	STEG report	STEG

	are treated similar to medium and high voltage customers, get their meters read and receive their bills monthly, and are managed by a unit devoted to large customers.				
Bill collection of private customers	Percent of bills of private customers get collected, measured as the ratio of amount of revenue collected over amount of revenue billed over any four-month period	Quarterly	STEG	STEG	STEG
Low voltage meters read remotely or with handheld devices	The percent of low voltage meters get read remotely (smart meters) or with handheld meter reading devices	Annual	STEG	STEG report	STEG
Communication/outreach campaigns on customer rights and responsibilities	In accompanying its effort to streamline the billing, collection, and customer processes, STEG will carry out multiple outreach initiatives, targeting regions of high non-technical and collection losses. The campaign will raise awareness about STEG's efforts to improve its customer service while motivating the customers to	Annual	STEG	STEG report and records of the communication materials	STEG Communications Department

	abide by the collective responsibility of billing by meter and on time bill payment.				
Ratio of female to male customers using electronic payment	The number of female customers over the number of male customers using electronic payment (STEG website, mobile payment, etc.)	Annual	STEG	STEG customer report	STEG
Share of customers aware of STEG's performance improvement effort	Percentage of customers knowing about STEG's effort to improve its performance	One time (2023)	STEG customer survey	Customer survey	STEG
Share of female customers aware of STEG's performance improvement effort	Percentage of female customers knowing about STEG's effort to improve its performance	One time (2023)	STEG's customer survey	Customer survey	STEG
The results of the consumer feedback sessions and the customer satisfaction survey, and STEG responses, are published	A citizen engagement mechanism will be implemented by soliciting and incorporating customer feedback into STEG's implementation of project activities through a series of public consultation across different customer types in representative regions and one customer satisfaction survey within the first half of the project (by 2021). The results of these sessions and	Annual	STEG's website	STEG's website	STEG

	the survey will be published on STEG's website, including STEG's responses to the feedback, on an annual basis.				

Disbursement Linked Indicators Matrix

DLI 1	HV and MV clients equipped with smart meters			
Type of DLI	**Scalability**	**Unit of Measure**	**Total Allocated Amount (USD)**	**As % of Total Financing Amount**
Output	Yes	Percentage	2.00	
Period	**Value**		**Allocated Amount (USD)**	**Formula**
Baseline	0.00			
2019			0.00	
2020	70.00		1.40	
2021	100.00		0.60	
2022			0.00	
2023			0.00	

DLI 2	Large low voltage customers included in the revenue protection program			
Type of DLI	**Scalability**	**Unit of Measure**	**Total Allocated Amount (USD)**	**As % of Total Financing Amount**
Output	Yes	Percentage	5.00	
Period	**Value**		**Allocated Amount (USD)**	**Formula**
Baseline	0.00			
2019	50.00		1.50	50% LV customers consuming more than 2500 kWh/month
2020	100.00		1.50	100% LV customers consuming more than 2500 kWh/month
2021	25.00		0.50	25% LV customers consuming 1750-2500 kWh/month
2022	50.00		0.50	50% LV customers consuming 1750-2500 kWh/month
2023	100.00		1.00	100% LV customers consuming 1750-2500 kWh/month

DLI 3	Bill collection of private customers			
Type of DLI	**Scalability**	**Unit of Measure**	**Total Allocated Amount (USD)**	**As % of Total Financing Amount**
Intermediate Outcome	Yes	Percentage	10.00	
Period	**Value**		**Allocated Amount (USD)**	**Formula**
Baseline	92.00			

2019	94.00	2.00	
2020	97.00	3.00	
2021	99.00	3.00	
2022	99.00	1.00	
2023	99.00	1.00	

DLI 4	Low voltage meters read remotely or with handheld devices			
Type of DLI	**Scalability**	**Unit of Measure**	**Total Allocated Amount (USD)**	**As % of Total Financing Amount**
Output	Yes	Percentage	2.50	
Period	**Value**		**Allocated Amount (USD)**	**Formula**
Baseline	0.00			
2019	50.00		1.25	
2020	90.00		1.00	
2021	100.00		0.25	
2022			0.00	
2023			0.00	

DLI 5	Communication/outreach campaigns on customer rights and responsibilities			
Type of DLI	**Scalability**	**Unit of Measure**	**Total Allocated Amount (USD)**	**As % of Total Financing Amount**
Output	Yes	Number	0.52	
Period	**Value**		**Allocated Amount (USD)**	**Formula**
Baseline	0.00			
2019	1.00		0.10	
2020	3.00		0.21	
2021	3.00		0.21	
2022			0.00	
2023			0.00	

Verification Protocol Table: Disbursement Linked Indicators

DLI 1	HV and MV clients equipped with smart meters
Description	For each additional percentage point of high and medium voltage clients provided with a smart meter, US$20,000 may be disbursed, up to US$1,400,000. From a baseline of 70%, for each additional percentage point of high and medium voltage clients provided with a smart meter, US$20,000 may be disbursed, up to US$600,000.
Data source/ Agency	STEG
Verification Entity	STEG' Inspection and Audit Office

Procedure	The Inspection and Audit Office verifies the result per the progress report of the Smart Grid Project provided by STEG. If necessary, the Office also confirms that the HV/MV customers' smart meters are connected to the consumer management system.
DLI 2	Large low voltage customers included in the revenue protection program
Description	This DLI requires gradual classification of large low voltage customers as large customers to be treated similar to medium and high voltage customers. These customers will be managed by the Revenue Protection Program (RPP) and have their meters read and receive their bills monthly. For each additional percentage point of large low voltage clients (with consumption over 2,500 kWh/month) incorporated into the RPP, US$30,000 may be disbursed, up to US$1,500,000. From a baseline of 50%, for each additional percentage point of large low voltage clients (with consumption over 2,500 kWh/month) incorporated into the RPP, US$30,000 may be disbursed, up to US$1,500,000. For each additional percentage point of large low voltage clients (with consumption less than or equal to 2,500 but over 1,750 kWh/month) incorporated into the RPP, US$20,000 may be disbursed, up to US$500,000. From a baseline of 25%, for each additional percentage point of large low voltage clients (with consumption less than or equal to 2,500 but over 1,750 kWh/month) incorporated into the RPP, US$20,000 may be disbursed, up to US$500,000.From a baseline of 50%, for each additional percentage point of large low voltage clients (with consumption less than or equal to 2,500 but over 1,750 kWh/month) incorporated into the revenue protection program, US$20,000 may be disbursed, up to US$1,000,000.
Data source/ Agency	STEG
Verification Entity	STEG's Inspection and Audit Office
Procedure	STEG's Inspection and Audit Office verifies the result based on the report from the Commercial Department which indicates the inclusion of the reclassified customers in the RPP who are metered and billed on a monthly basis.
DLI 3	Bill collection of private customers
Description	Measured as the ratio of amount collected (in million of Tunisian Dinar) over amount billed among private customers over any four-month period. For each percentage point of collection rate increase above 92%, US$1 million may be disbursed, up to US$2 million. From a baseline of 94%, for each additional percentage point of collection rate, US$1 million may be disbursed, up to US$3 million.From a baseline of 97%, for each additional percentage point of collection rate, US$1.5 million

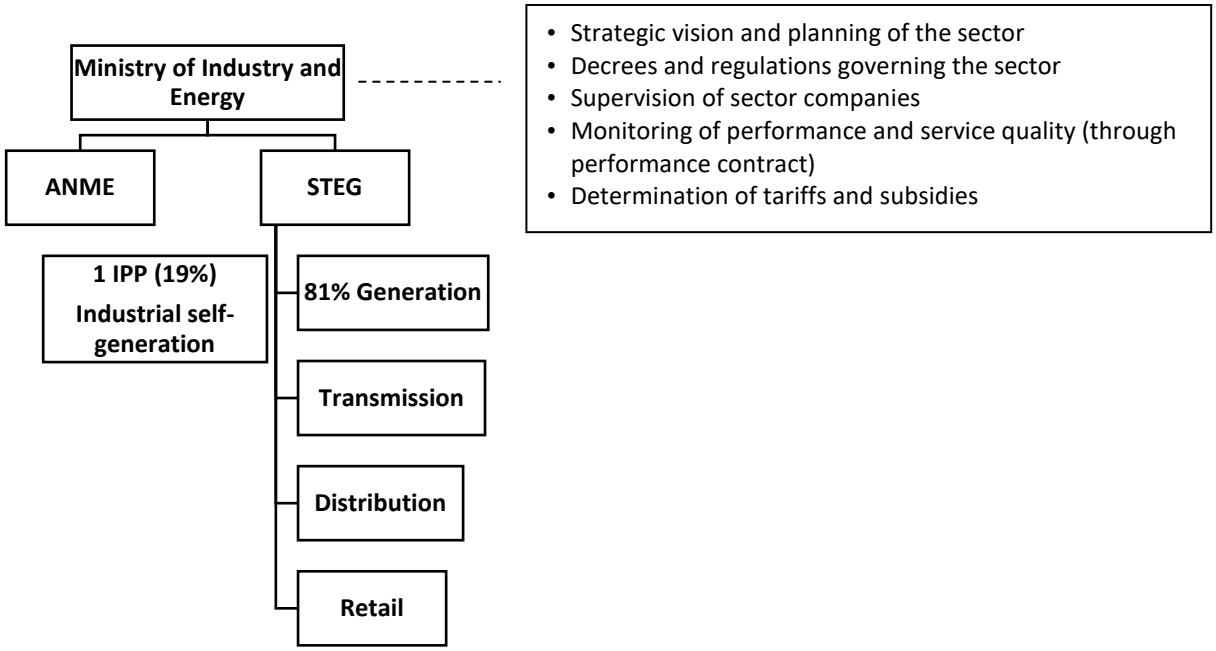
	may be disbursed, up to US$3 million. Once the collection rate reaches 99%, (expected in 2021), US$1 million may be disbursed if the collection rate remains at 99% in subsequent years.
Data source/ Agency	STEG
Verification Entity	STEG's Inspection and Audit Office
Procedure	The STEG's Inspection and Audit Office verifies the result per the report from the Commercial and Finance departments which shows the amount of revenue collected from private customers as a percentage of total amount billed.
DLI 4	Low voltage meters read remotely or with handheld devices
Description	Percentage of low voltage customers having their meters read remotely (smart meters) or with handheld meter reading devices to reduce inaccuracies of meter reading. For each additional percentage point of low voltage meters read using hand-held devices, US$25,000 may be disbursed, up to US$1,000,000. From a baseline of 50%, each additional percentage point of low voltage meters read using hand-held devices, US$25,000 may be disbursed, up to US$1,000,000. From a baseline of 90%, each additional percentage point of low voltage meters read using hand-held devices, US$25,000 may be made disbursed, up to US$250,000.
Data source/ Agency	STEG
Verification Entity	STEG's Inspection and Audit Office
Procedure	The STEG's Inspection and Audit Office verifies the result per the report by the Commercial and IT departments which indicates which customers have their meters read electronically (hence consumption recorded directly in the IT system).
DLI 5	Communication/outreach campaigns on customer rights and responsibilities
Description	Up to US$100,000 may be disbursed for the first communication/outreach campaign in 2019. For the two years 2020 and 2021, US$70,000 may be disbursed for each communication/outreach campaign, up to 3 campaigns per year.
Data source/ Agency	STEG Communications Department
Verification Entity	STEG Inspection and Audit Unit
Procedure	Verification of the campaigns launched through records of the campaigns and the associated materials.

ANNEX 1: Implementation Arrangements and Support Plan

A. Institutional and organizational arrangements

1. The electricity sector of Tunisia is dominated by STEG, which, as a vertically integrated utility, owns 80 percent of generation and has the monopoly of transmission, distribution, imports and exports of electricity and gas. Created in 1962 after independence, when the GoT decided to nationalize the electricity and natural gas sectors,[31] STEG is a public institution with financial autonomy under the supervision of the Ministry of Industry. The only IPP is the Rades II combined cycle gas turbine (CCGT) power plant with a capacity of 471 MW owned by the Carthage Power Company. STEG is also the single buyer for self-production of electricity. The Ministry of Industry is in charge of both sector planning and regulation. The National Agency for Energy Management (*Agence Nationale pour la Maîtrise de l'Energie* – ANME), created in 1985 under the Ministry of Industry, is responsible for research and policies to promote energy efficiency, renewable energy, and energy substitution. The sector does not yet have an independent regulator. The overall structure of the sector is presented in Figure 1.

Figure 1: Institutional structure of the electricity sector in Tunisia



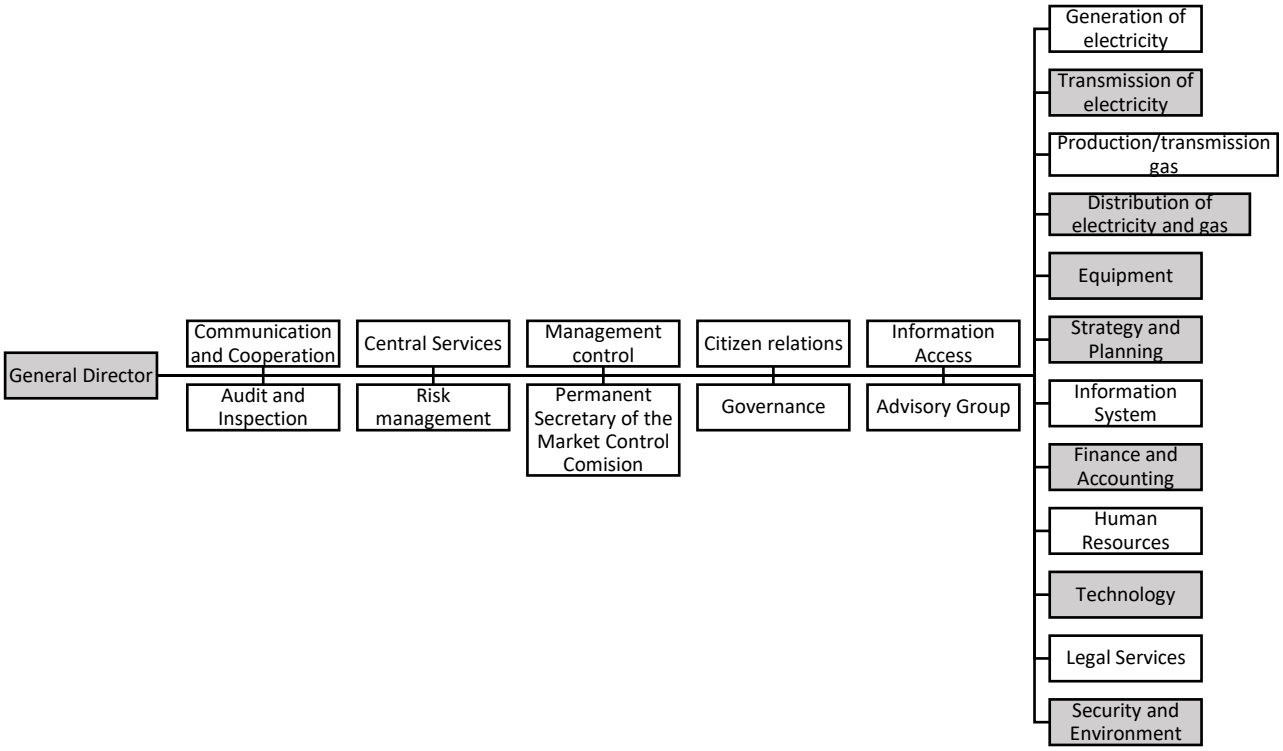
2. STEG was instrumental in achieving almost universal access to electricity in the country, from an access rate of 21 percent in 1962. By 2017, its installed power generation capacity had reached 5,309 MW, and electricity supply totaled 15,561 GWh delivered to its nearly 4 million customers. STEG signed a performance contract with the Ministry of Energy (now integrated into the Ministry of Industry) covering the period 2016-2020 with the objective to improve the quality of

[31] Under Law No. 62-8 of April 3, 1962.

service and reduce losses. STEG employs around 12,000 people and is organized around functional units managed by a Board and a General Director.

3. STEG will be the sole implementing agency of the proposed Project. All departments relevant to the Project have been mobilized and coordinated by the Director of Technology. STEG's organization chart is presented below with participating units highlighted.

Figure 2: Institutional structure of STEG



Note: This organization structure was approved in 2017 and is still being put in place by the HR Department

4. STEG will assign a dedicated internal Project Implementation Team (PIT) to manage the Project. This is not a separate unit but rather a team of STEG's experienced professionals identified from the concerned departments including: (i) a Project Manager (PM), who will coordinate all project activities and will be the main counterpart of the Bank during project implementation; (ii) a Procurement Specialist; (iii) a Financial Management Specialist; (iv) an Accountant; (v) an Environmental Specialist; (vi) a Social Safeguards Specialist; and (vii) a Monitoring and Evaluation Specialist. The PM will rely on a number of engineers and technical specialists from the transmission, distribution and environment departments to draft technical specifications, evaluate technical proposals and monitor implementation of the EPC and other contracts, as well as studies. A consultant with experience in social safeguard (resettlement) will also support the PIT in the implementation of the RPF and RPs. The exact implementation procedures for all fiduciary and safeguards aspects of the Project are described in a Project Implementation Manual (PIM) prepared by STEG and submitted for approval by the Bank. Any revisions to the PIM during implementation will need to be approved by the Bank.

5. Funds made available to the Project from IBRD will be channeled directly to STEG through a Loan Agreement (LA) entered into between STEG and the World Bank. The LA details all provisions concerning the loan. This will be guaranteed

by the GoT and a separate Guarantee Agreement will be entered into by the Republic of Tunisia and the Bank. As an SOE with a long track record of implementing projects funded by other development partners, including EIB, EBRD, Islamic Development Bank and JICA, STEG has the capacity to implement and manage investments under the Project. The utility has also acquired some familiarity with Bank's fiduciary requirements during the implementation of the Elmed Project.

B. Financial Management (FM)

6. **Country public financial management analysis.** The 2017 Public Expenditure and Financial Accountability assessment (PEFA) conducted for Tunisia concluded that the country's legal and administrative framework for public financial management offers an adequate level of assurance regarding reliability of information; predictability and control in budget planning and execution; and a strong control environment. However, the report identified room for improvement in a few areas, particularly in terms of budget comprehensiveness, transparency and accountability. Ongoing technical assistance has been mobilized by donors (particularly the European Union, the World Bank, the IMF and AfDB) to address the remaining shortcomings. The Project's activities to be carried out by STEG will make wide use of the Tunisian public financial management systems, and, in particular, of the procedures for budget preparation, execution, ex-ante control and monitoring by the State Controller (*Contrôleur d'Etat*) of the SOE; and ex-post review controls such audits performed by government independent bodies.

7. **Organizational arrangements and staffing at STEG**. As an SOE with a long track record, STEG's staff is more than adequate to manage the Project's activities.

8. **Assessment of FM risks**. The table below summarizes the FM risks identified during assessment, and the measures proposed to address them.

Risk type[32]	Risk Rating	Inherent Risk (IR), Control Risk (CR) and Mitigating Measures (MM) incorporated into Project design
Inherent risk	**M**	
Country level	M	The Public Expenditure and Financial Accountability diagnostic 2015 (PEFA 2015) concluded that the legal and administrative framework for public financial management in Tunisia is sound and offers a solid level of assurance regarding the reliability of information. Overall, the budgetary process is reliable and there is a strong control environment. Nevertheless, there are transparency and accountability failures that still need to be addressed. The GoT has embarked on a series of public financial management reforms that aim to improve transparency and accountability, including a results-based budget, accounting reform, a treasury single account, a new organic budget law, etc.
Entity	M	**IR –** STEG is well established with a long track record as SOE and with experience in managing donors' funded projects; however, STEG is not familiar with the Bank's procurement, financial management and disbursements procedures. **MM** – STEG will assign experienced personnel, including a Financial Management Specialist (FMS) to the Project Implementation Team in housed in the entity to handle the Project's activities. The Bank will train the FMS on the Bank's financial management procedures.

[32] The **inherent FM risk** arises from the environment in which the project is implemented. The **FM control risk** is the risk that the FM system is inadequate to ensure that project funds are used economically and efficiently and for the intended purpose. The **overall FM risk** is the combination of the inherent and control risks as mitigated by the client control frameworks. The **residual FM risk** is the overall FM risk as mitigated by the Bank supervision effort.

Risk type[32]	Risk Rating	Inherent Risk (IR), Control Risk (CR) and Mitigating Measures (MM) incorporated into Project design
Project	M	**IR** – The Project might not meet the readiness conditions as required in the new country Public Investment Management unified framework (which includes non-objection by the National Committee for Approval of Public Projects – CNAPP). **MM –** STEG has prepared and submitted to the CNAPP all the supporting documents to obtain approval and meet all readiness conditions.
Control risk	**M**	
Budgeting	M	**CR –** STEG is an SOE that follows the decree no 2002-2198 in the preparation of its budget. STEG CEO prepares the budget and submits it to the Board before the end of August of the calendar year n-1. Once approved by the Board, the budget along with the minutes of its approval is submitted to the Ministry of "'tutelle"' (Ministry of Industry in this case). The Ministry has 1 month to approve it, after which the budget is deemed approved. This budgetary calendar is generally followed by STEG, but in certain years delays have occurred. STEG is using a computer software for recording budgetary and accounting transactions and for generating financial reports. This is endowed with adequate budgeting arrangements overseen by a State Controller and the Board in line with the country financial management arrangements enforced for SOEs. Overall, STEG has a budget execution ratio that ranges from 95% to 100%. No material risk was identified. **MM –** The following actions will be implemented to consolidate the budgeting arrangements: i) STEG will submit to the World Bank the project's annual budgets for non-objection not later than end of January of each year ii) Project's transaction will follow the national budget arrangements enforced for SOEs; and iii) The PIM will be developed and will describe the FM procedures including the budget arrangements.
Accounting	M	**CR** – STEG is using a computer software for recording accounting transactions and for generating the financial reports. STEG is using the national accounting standards for the private sector. STEG is also working on the implementation of International Financial Reporting Standards. STEG has the practice to create dedicated units for the implementation of donor-funded projects, staffed with FM specialists. These are normally assigned from the Directorate of Financial and Administrative Affairs, which provides them with support throughout the project cycle. In absence of dedicated FM staff to the project management, there is a risk of project accounting arrangements. **MM** – STEG will dedicate among its staff an experienced FMS conversant with donors' procedures will use the existing accounting software to book the project's accounting transactions separately. The PIM will include accounting procedures to be applied by STEG.
Internal Control / Internal audit	M	**CR** – No significant risk has been identified. **MM** –The PIM will describe in detail the internal control procedures. STEG's internal control and internal audit arrangements will be used.
Flow of Funds	M	**CR** – STEG's experience with donor-funded projects and the existence of a simple implementing entity will lower the risk in the flow of funds. However, STEG is not familiar with the Bank's disbursements procedures (Designated Account, Direct Payment, Reimbursement), which has been identified as a potential risk. **MM** – To mitigate risks related to the flow of project funds, a training on the Bank's disbursement procedures will be provided to STEG's fiduciary staff.
Financing Reporting	M	**CR** – The external audit report underscored weaknesses in the financing reporting arrangements. The current financial statements are elaborated based on a mix of local accounting standards and international financial reporting standards. This affects the reliability of the financial information and the decision-making process. **MM** – To mitigate this risk, a technical assistance will be provided for the implementation of International Financial Reporting Standards. The following actions will complement the FM arrangements: i) The PIM will clearly define financial management reporting responsibilities, specifying which reports must be prepared, by whom, and their due dates and required content. ii) Customized Interim Financial Report will be agreed. The existing accounting software will be used.

Risk type[32]	Risk Rating	Inherent Risk (IR), Control Risk (CR) and Mitigating Measures (MM) incorporated into Project design
Auditing	M	**CR** – STEG is endowed with an adequate external audit arrangement. The audit reports are produced on June of each year; however, delays in the submission of the audit reports might occur. **MM –** STEG's external audit arrangements will be extended to the Project to ensure timey submission of the audit report. Monitoring of the submission of the audit report will be performed as part of the Bank's FM supervision.
Overall FM risk	**M**	

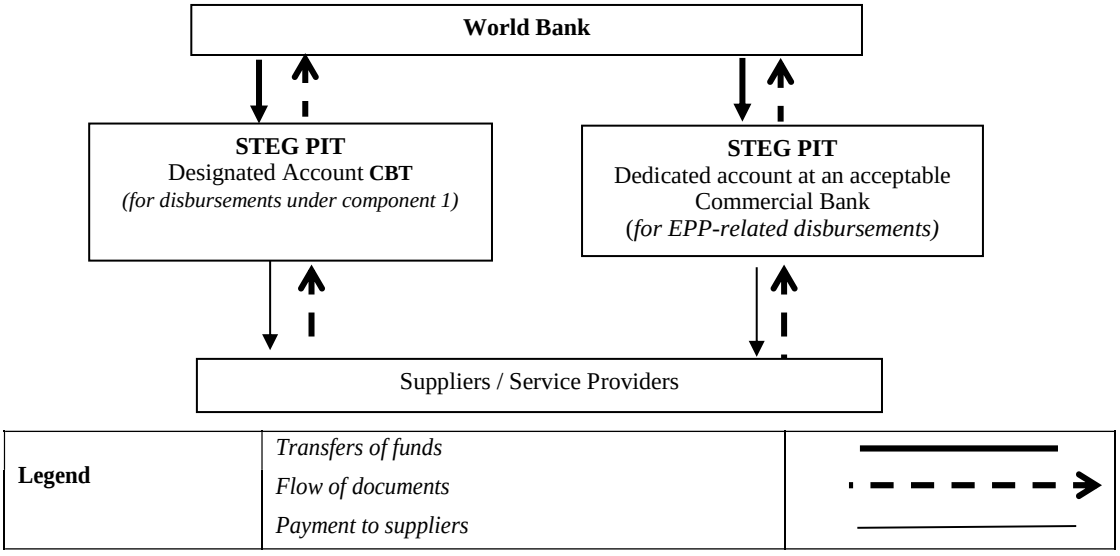
9. **Annual work program.** STEG will prepare and submit to the Bank a proposed annual work program and budget for the Project the next following fiscal year (FY), including: (a) a time table of programs and activities scheduled for implementation during that FY; and (b) the estimated costs of each activity, along with related sources of funding.

10. **Budgeting**. STEG will use budgeting procedures for the Project, which are deemed to be acceptable as they are in line with the country system and budgetary calendar and practices as per decree no 2002-2198. The PIM will describe the procedures for preparation, execution, and control applicable to activities under the Project, to be implemented in line with the country financial arrangements enforced for SOEs.

11. **Accounting and information management system.** STEG is using the Tunisia's private sector accounting standards which are acceptable to record Project's transactions and produce the financial statements. STEG is also working on the adoption of International Standards Financial Reports (IFSRs), which are expected to be used for producing financial statements in the mid-term. STEG's Financial Directorate will support the PIT, which will be responsible to book the Project's transactions under its responsibilities using the current information management systems. The Project will help strengthen the financial reporting of STEG by accelerating the adoption of ISFRs.

12. **Internal controls and internal audit.** The PIM will describe the internal control procedures for Project activities. STEG will apply its internal control procedures, which were found adequate. STEG's internal audit will include the review of Project's transactions in the annual audit plan. The Project could support the strengthening of STEG's internal audit department, so that it will be better equipped to advise and provide recommendations for improving fiduciary and commercial aspects, critical to STEG's performance.

13. **Funds Flow.** A Designated Account (DA) for investments under component 1 will be opened at the Central Bank of Tunisia and a dedicate account for disbursements for EPP will be established by STEG at a Commercial Bank acceptable to the Bank. Further advances to the Project's DA will be made upon reporting on the use of a prior advance. The PIT (through the CBT) will report on the use of loan proceeds advanced to the DA in accordance with the Disbursement and Financial Information Letter (DFIL). Calls for funds for DLIs will be executed by STEG based on verification reports in line with the provisions set forth in DFIL. Only reimbursement is the disbursement method available for the DLI payments based on the nature of the Eligible Expenditure Programme defined in the Loan Agreement. Total Project's eligible expenditures will be summarized in the Statement of Expenditures prepared by CBT and will be submitted to the Bank for processing. The retroactive financing of certain categories of expenditures made prior to the signature of the Loan Agreement might be considered in concertation with Project's counterparts if needed. If the Bank determines that an ineligible expenditure has been financed by loan proceeds, the Bank may require STEG to refund the amount to the DA, or in exceptional circumstances, as provided in the Bank disbursement policies, provide substitute documentation. The description of the funds flow is presented below:



14. **Financial reporting**. The format of the Interim Financial Reporting (IFR) to be prepared 45 days after the end of the calendar semester and the Financial Statements will be agreed during the negotiations and reflected in the PIM. Each IFR will comprise the following: (i) the report on the sources and use of funds cumulative (project-to-date; year-to-date) and for the period, showing budgeted amounts versus actual expenditures, including a variance analysis; (ii) the forecast of sources and uses of funds; and (iii) the reconciliation of the DA.

15. **External Audit.** STEG's external audit arrangements will be used for the Project. Its external auditor acceptable to the World Bank will produce a separate audit report on its share of Project's transactions. The auditor will produce: (a) an annual audit report including an opinion on the Project's annual financial statements; and (b) a management letter on internal controls. Each audited Financial Statements and audited Project Financial Statements must cover the period of one calendar year. The audited Project Financial Statements shall commence with the fiscal year in which the first withdrawal was made. The audited Financial Statements of the Borrower shall commence with calendar year 2018. The audited Financial Statements for each such period must be furnished to the Bank not later than six (6) months after the end of such period.

C. Procurement

16. As sole implementation agency, STEG will carry out the Project's procurement.

17. **STEG's Capacity Assessment**: This assessment is based on the Bank's knowledge of: (1) STEG's procurement activities carried out under the *Tunisia-Italy Power Interconnector - Project Preparation TA (P164625);* and (2) STEG's procurement experience under similar MDBs-funded projects. The main objective of this capacity assessment was to determine whether the Implementing Agency (IA) has the capacity to adequately carry out the procurement function of the Project. This evaluation took into account the entire contracting process, which encompasses: (i) planning; (ii) preparing procurement documents; (iii) receiving and evaluating bids or proposals; (iv) finalizing, signing and managing contracts; (v) monitoring projects' implementation; and (vi) filing and archiving documents for audit and post review. STEG has staff with good experience in procurement management under project funded by multilateral and bilateral financiers,

including projects funded by the AfDB and the IsDB. This staff is responsible for all the procurement processing from the preparation of the bidding documents to the notification to the consultant/supplier/contractor and for record keeping.

18. **The procurement risk is rated to be *Moderate***. The assessment revealed that STEG has gained extensive experience in MDBs' procurement procedures. Nevertheless, the following risks are plausible: (a) difficulties encountered by STEG in handling the volume of procurement under the Project; and (b) duplication between national and Bank's procurement procedures, and a too slow, cumbersome and bureaucratic procurement prior review by the national procurement oversight bodies. These two risks may result in bottlenecks and slow implementation of the Project. To mitigate the identified risks, the following measures are proposed: (i) training to the Project PIT on the Bank's Procurement regulations in general and on the Bank's standard procurement documents especially for supply and installation contracts; and (ii) ensuring that the Project Procurement Strategy for Development (PPSD) prepared by STEG clearly describes how procurement operations will be carried out in an optimized manner to support the development objectives of the Project and to deliver value for money.

19. **Procurement arrangements**. Procurement for the Project will be carried out in accordance with World Bank Bank's Procurement Regulations for IPF Borrowers (Regulations), July 2016 edition, revised in November 2017, and August 2018, and the provisions stipulated in the Legal Agreement. The project will be subject to the Bank's Anticorruption Guidelines ('Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants'), dated October 15, 2006, and revised in January 2011 and July 2016.

20. **Compliance of IPF-DLI activities with procurement rules and Compliance with anti-corruption guidelines**: While most of the identified IPF-DLI activities are non-procurable, the Bank's procurement rules apply to all contracts financed wholly or in part by the Bank for procurable items. When procurable items are organized as a budget line, the Bank's rules apply to the entire budget line, not merely to the part financed by the Bank. As stated in the Bank's Guidelines on Preventing and Combating Fraud and Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants, STEG shall ensure that, for IPF-DLI activities, preventive measures are in place (e.g. application of Bank's debarment list) and to report and investigate allegations of misconduct. Remedial measures apply only to those expenditures financed by the Bank.

21. **Project Procurement Strategy for Development (PPSD) and Procurement Planning.** The PPSD has been drafted in accordance with the Bank's Regulations. Also, the initial Procurement Plan for the 18 first months of the project has been prepared based on the outcomes of the PPSD. The PPSD will allow STEG to consider, among other things, the market situation, the operational context, previous experience and the ongoing risks, and, on that basis, determine the right procurement approach that will yield the right type of response from the market. As result, there will be far more likelihood of the right bidders participating, better bids being received, and an overall increased chance of achieving value for money. Therefore, determining the right procurement approach, informed by appropriate analysis, is a critical activity that subsequently impacts every following step of the procurement process, and onwards into project implementation. The PPSD findings are summarized in the table below.

Contract Title, Description and Category	Estimated Cost (US$ Million)	Bank Oversight	Procurement Approach/Competition	Selection Method	Evaluation Method
AOI N°1: Design, supply and equipment of electricity transmission network infrastructure: (i) construction of 420 km of high-voltage (HV) transmission lines, including 192 km of 400kV double-circuit lines and 192 km of 225 kV single circuit lines	89. 050	Prior	International/turnkey	Post-qualification	Lowest Evaluation Cost
AOI N°2: Construction of a 400/225 kV substation associated with the Skhira plant; and (iii) reinforcements of existing substations at Thyna (225/150 kV) and Tataouine (225 kV) through the installation of new lie bays and/or transformers.	33.450	Prior	International/turnkey	Post-qualification	Lowest Evaluation Cost

22. **Standard Procurement Documents.** For international competitive procurement, STEG shall use the Bank's Standard Procurement Documents (SPDs), available on its external website at www.worldbank.org/procurement/standarddocuments.

23. **Thresholds for procurement approaches and methods (US$ thousands).** The following thresholds will apply:

Works			Goods, IT and non-consulting services			Shortlist of national consultants
Open international ≥	Open national <	RfQ ≤	Open international ≥	Open national <	RfQ ≤	<
10,000	10,000	300	3,000	200	300	300

24. **Bank's procurement prior review thresholds.** Given the Moderate risk rating of the Project, activities to be procured by STEG in accordance with the Bank's Procurement Regulations for IPF Borrowers at or above the thresholds set out below will be subject to the Bank's procurement prior review:

Type of procurement	*Threshold* (US$ millions).
Works (including turnkey, supply & installation of plant and equipment, and PPP)	15
Goods, information technology, and non-consulting services	4
Consulting services: firms	2
Consulting services: individuals	0.4

25. **Environmental, Social, Health and Safety (ESHS) in Project's procurement.** STEG should set out its expectations to bidders/proposers with respect to ESHS performance during works implementation. This is best achieved in the form of a statement (for example, an ESHS policy) that captures and clearly communicates the overall objectives of STEG's legislation, regulation, standards, practice, specifications and requirements. STEG's ESHS policy should be a simple, brief (e.g. one-page) and unambiguous series of statements appropriate for the works and specific to the ESHS issues, risks and impacts of the Project. It should require, for example, Good International Industry Practice, a safe and healthy worksite, and the intent of applicable laws, regulation etc. so that it is clear how they are to be interpreted in practice.

26. The Bank's Standard Procurement Documents (SPDs) provide guidance on the topics to be included in the Borrower's ESHS policy. STEG's policy should specify what the contractor and Contract Manager will be required to deliver and well as describe the standards against which performance will be measured to drive ESHS outcomes.

27. **Records.** STEG shall keep records of all proceedings of the Procurement Process in accordance with the requirements of the Legal Agreement.

D. Implementation Support Plan

28. The strategy for project implementation support (IS) by the World Bank reflects the nature of the Project and its risk profile. The strategy aims at making IS to STEG more efficient while remaining focused on implementation of the risk mitigation measures identified in the SORT. The strategy is also an indicative and flexible instrument that will be revisited during project implementation and as part of the routine reviews of the Project and will be adjusted based on emerging project challenges and field conditions.

29. **Overall Project Implementation**. Project supervision will review the progress in the implementation of each component and support the following critical areas: (i) technical implementation support to ensure the project is being carried out in an effective manner; (ii) fiduciary capacity support to ensure that the project funds are used to achieve value for money as well as that there is adequate capacity and internal control systems and overall governance; and (iii) management of environmental and social factors in the project area of influence. Dedicated attention will be paid to the procurement and execution of the works under component 1, as they entail construction of large transmission infrastructure and account for the bulk of project funds. While this is the first energy sector project funded in Tunisia in a long period, the Bank has established a close partnership with the GoT and energy sector stakeholders, as result of the extensive policy and technical support to the tariff and subsidy reform, as well as the improvement of STEG's performance as part of the ESMAP TA and the 2018 DPF. Also, mutual experience has been developed through the *Tunisia-Italy Power Interconnector - Project Preparation TA*. All of such support has earned the Bank the reputation of a trustworthy partner delivering top quality advisory services. The relations between the GoT and the Bank are well established, also as result of the effective and integrated assistance provided by the Bank to handle the multiple challenges associated with Tunisia's macro-fiscal situation and the related debt exposure limitations. The Bank team will leverage on these good results and continue close dialogue and mutual collaboration with the GoT. Team members will ensure timely, efficient, and effective implementation support to STEG and carry out formal implementation support missions at least two times a year.

30. **Technical Support**. The supervision mission will review the progress in the implementation of each component. The Power Engineer on the World Bank team will provide the required assistance, advice, and guidance to STEG on various technical aspects of the transmission investments. He will review technical specifications of bidding documents for the project and bidding evaluations reports and provide advice as needed. This expert will also conduct site visits with the supervision mission and STEG to verify physical implementation progress and ensure proper guidance. Dedicated guidance will also be provided in the implementation of component 2, especially on the procedures for meeting DLIs, and tracking and reporting the level of their achievement. Also, support and advice will be provided to the established verification agency on how to assess the achievement of DLIs.

31. **Fiduciary Support.** The supervision missions will ascertain whether the procurement and FM provisions of the Project Legal Agreements and Operations Manual are being followed. The FM Specialist will review the: (i) project accounting and internal control systems; (ii) budgeting and financial planning arrangements; (iii) IFRs; (iv) audit reports, including financial statements, and remedial actions recommended in the auditor's Management Letter; and (v) disbursement management and financial flows. Supervision of procurement will be carried out primarily through prior review supplemented by supervision missions at least twice a year. Procurement supervision will be closer during the first 18 months of project implementation, which is when procurement for the major investments is expected to be completed. The missions will also discuss progress in the implementation of the Procurement Plan.

32. **Environment/Social Support**. World Bank specialists in environmental and social risk mitigation (safeguards) will be responsible for supervising the STEG's compliance with World Bank Group safeguards policies and the preparation and implementation of the ESIA once project locations will be confirmed. They will conduct supervision missions and site visits to the field twice a year during the duration of the Project, review deliverables prepared and provide assistance to STEG as needed.

33. **Policy dialogue on macroeconomic issues and sector strategies.** The Bank will remain closely engaged with the GoT and other partners (including the IMF) to support macro-fiscal stabilization in the country. The parallel TA being carried out by the Bank, is providing critical support to the subsidy reform and to improve STEG's financial situation. This collaboration will be continued throughout the implementation of the identified measures, which are in part covered by the DLIs. The Energy Economist assigned to the team is also leading the ESMAP TA and will ensure that this and the Project remain closely linked. She will participate in supervision missions and ensure coordination with relevant stakeholders within the GoT at large, STEG and external partners. The Bank team will also liaise with the GoT to anticipate and address governance and political risks, as well as shifting energy sector priorities in the leadup to elections and as new government is established. There is broad based consensus across the political spectrum about the importance of developing Tunisia's RE potential, thus commitment to the Project is expected to remain firm. The ESMAP TA also constitutes an ideal platform to provide on-demand technical assistance and advisory services to support the transition towards a more open and competitive power market – notably through the establishment of an independent regulation agency.

34. The overall implementation support plan for the Project and resource requirements are described in Table 1 and Table 2 below.

Table 1: Resources Required by Time Frame

Time	Focus	Skills needed	Resource estimate (staff weeks)
First 18 months	Project management	TTLs, energy specialists	20
	Power engineering	Power engineer	4
	DLIs	Energy economist	4
	Procurement implementation support	Procurement specialist	6
	Financial management implementation support	Financial management specialist	3
	Environmental implementation support	Environmental specialist	4
	Social implementation support	Social specialist	4
18 months - project end date	Project management	TTLs, energy specialists	20
	Power engineering	Power engineer	4
	DLIs	Energy economist	4
	Procurement implementation support	Procurement specialist	4
	Financial management implementation support	Financial management specialist	4
	Environmental implementation support	Environmental specialist	4

	Social implementation support	Social specialist	4

Table 2: Skills Mix Required

Skills needed	Number of staff weeks	Number of trips per year
TTLs	30	2
Power engineer	3	2
Energy economist	4	2
Procurement specialist	4	2
Financial management specialist	4	2
Environmental safeguard specialist	4	2
Social safeguard specialist	4	2

ANNEX 2: Detailed Project Description

A. Overall rationale of project investments

1. The main objective of investments under *Component 1: Strengthening the electricity transmission network (US$131 million)* is to provide a transmission backbone connecting the southern and eastern regions of Tunisia, where new generation projects will be installed, to the northern regions, where the bulk of demand is located, and connect the PV plant Borj Bourguiba in Tataouine (200 MW) to be commissioned during 2021-2022 under the concession regime. In addition to enabling the integration of new generation capacity to be commissioned in the short- to medium-term, the proposed investments will increase the wheeling capacity along the south-north corridor and improve its reliability and stability in the face of long-term expansion of generation capacity. This is very much needed in light of the fast-increasing electricity demand. The last 10 years have witnessed a steady growth of peak demand by 5 percent per year, equivalent to the installation of additional 340 MW (2-megawatt gas turbine) every two years. According to the energy sector analysis included in the FYDP 2016-2020, demand peak is expected to grow by 4.6 percent per year and reach 4,460 MW in 2019. The peak has also changed in nature, gradually moving from winter night peak to summer day peak, which creates opportunity for RE integration. Demand is expected to continue to grow by 3.9 percent in 2021-2025, and 3.2 percent in 2026-2030, which will increase consumption from 19 GWh (as at the end 2017) to 26.8 GWh by 2030.

2. Tunisia's current generation capacity is 5,780 GW, most of which is thermal (including 471 MW thermal IPP). About 1,807 MW of thermal capacity is expected to be decommissioned by 2030. To meet forecasted demand growth and diversify energy sources, the GoT has planned to add 1200 MW of RE capacity by 2022, both in the form of IPPs and commissioned by STEG. This includes 820 MW of PV generation to contribute to day peaks for up to 50 percent of its capacity, and 380 MW in wind capacity to save gas. In addition, STEG is expected to commission 520 MW of RE (300 solar and 220 wind) between 2023-2025. Also, the GoT plans to develop two gas-fired combined cycle power plants of 450-500 MW located in Skhira, the first to be commissioned by STEG by 2022 and the second (Skhira 2 IPP) as an IPP by 2025. Skhira 2 is intended to provide 10 percent reserve capacity in view of the forecasted demand peaks by 2025. Given the time needed to plan and procure thermal power plants (about 4 years before actual operation), and the urgent need to meet the peak demand for electricity on the short term (especially in 2019 and 2020), the GoT decided to start procuring Skhira 1 through a traditional EPC contract and to study the possibility to undertake the additional 450 MW as an IPP contract (Skhira 2)[33]. Thus, by 2025, the reinforced south-north backbone will also be used to transmit power from Skhira 2.

3. **Rationale of transmission network reinforcements.** In preparation to the concession scheme, STEG completed a connection study (published on July 15, 2018) to identify the optimal reinforcement of the HV network required to integrate the planned RE generation expansion as well as gas-fired generation additions over the long term. With the integration of RE (1200 MW under preparation), in addition to Skhira plants (2X450-500 MW by 2025 and potentially 3X450-500 MW in the long term) and taking into account the evolution of the load on HV/MV substations, there will be a clear demand-supply imbalance in several areas of the country (i.e. overproduction in the southern region compared to the center and northern regions). Different scenarios were simulated and analyzed in the study, and all showed the need for transmission network reinforcements. The following facilities and related configurations were identified as priorities

[33] Natural gas will remain the main fuel for electricity generation, so the Skhira projects constitute the continuity of the choice of type "F" gas turbines, with an energy efficiency of 60 percent (combined cycle).

under the study: (i) a new 400/225 kV substation at Kondar with three 400/225 kV (400 MVA) auto-transformers; (ii) the new double circuit 400 KV Skhira-Kondar line (192 km); (iii) installation of a 400/225 kV (400 MVA) auto-transformer at Skhira's substation[34]; and (iv) a 225 kV line-in-line-out on 225 kV Bouficha-Chott Mariem to the new Kondar substation (6.5 km). The study also concluded that a new 225 KV line from Skhira to Thyna (85 km) and a new 225/150 kV (200 MVA) transformer at Thyna would be required to adequately strengthen the transmission system in the south of the country. In addition, connection to the Borj Bourguiba PV will require a 225 kV line (100 km) with a substation reinforcement in Tataouine. The proposed configurations take into account all the RE generation additions planned up to 2025 that have been modeled within the framework of the connection study. The preliminary routing of the connection lines has been identified. The costs of the lines do not take into account the needed work on the power plants' substations, which are included in the IPP's scope.

4. **Conclusion.** The study concluded that the 400 kV Skhira-Kondar line and the 225 kV Skhira-Thyna are required to strengthen the North-South axis of Tunisia's power transmission system and provide the required wheeling capacity to evacuate all the new RE generation. Without these two new lines, the absorption capacity of the transmission network is limited to 200 MW of variable renewable energy (VRE) generation from the South. As result, there would be a significant limitation (of around 78 percent) to the integration of new capacity to be commissioned in the southern part of the country by 2023. The curtailment of VRE generation would have a severe financial impact on STEG as it negotiates *take or pay* contracts with IPPs. In addition, in the absence of these reinforcements, transmission losses in terms of power (peak situation) and energy would reach respectively 69 and 10 percent and technical losses would double from 78 MW to 132 MW. The proposed investments will allow to blend significant VRE generation with gas-fired capacity, with the latter balancing the intermittency of VRE and providing spinning reserves that help frequency regulation. The enhanced grid stability and flexibility of the power system dispatching will avoid curtailing of new solar and wind generation capacity and hence will help improve investor confidence in VRE. Overall, the Project will be critical in enabling energy diversification. The 400 kV Skhira-Kondar line will also play a key role in supporting regional connectivity, by facilitating future power trade with Europe once the Elmed Project is completed, as well as with other Maghreb countries. The need for a 400 kV transmission backbone has emerged from several studies, such as: (i) the ELTAM (Egypt-Libya-Tunisia-Algeria-Morocco) study, which assessed options for regional interconnection in the Maghreb; and (ii) as part of the Med-TSO Mediterranean I Project, promoted by the Association of the Mediterranean Transmission System Operators (TSOs) for electricity, which aims at the progressive harmonization and strengthening of the electricity markets in the Mediterranean region.

5. **Integration of VRE.** The integration of significant VRE capacity will have transformational and undoubtedly positive effects; however, for these to be sustainable, adaptation will be needed on several fronts. Several studies have been completed by STEG and development partners to assess network stability and reserve requirements in the face of increasing intermittency of power production; adaptation in terms of network planning, network reinforcements, dispatch operations; as well as regulatory requirements. Specifically, GIZ has conducted a network study to: (i) identify constraints and additional generations costs due to RE integration; (ii) estimate non-delivered renewable energy (END) due to network constraints; and (iii) propose emergency measures to reduce END. The study has concluded that the planned integration of VRE by 2022 will not endanger power system security if dispatching procedures are properly adapted and grid code requirements on VRE connections are respected. According to the study[35], it will be possible to inject into the system approximatively 98.2% of the available VRE capacity, leading to 82,5 GWh of END or 10.5 Million Dinar per year of stranded

[34] This investment will be financed by the IPP of Skhira's Plant

[35] The GIZ study also identified additional tasks to be completed, including: (i) the revision/updating of operational procedures; (ii) assessment of operational reserve needed to compensate for VRE; (iii) a detailed study to identify equipment needed to stabilize the system (voltage regulation) in the short term; and (iv) cost-benefit analysis of storage facilities (BESS).

costs. Despite the cost of END, the integration of VRE will lower power generation costs by 126 Dinar/MWh. JICA has financed a pre-feasibility study concerning installation of storage batteries, to be followed by an in-depth study once the specific sites are identified. STEG is assessing the feasibility of pumped storage technologies (STEP), and specifically of a 400 MW power plant at Oued Melah in the North-West region of Tunisia. Finally, IFC will finance a study to enhance STEG's operational, dispatch and control functions in view of increasing VRE integration. The study will identify a detailed roadmap to establish system operation measures and enhance dispatch and control procedures in a manner to allow the safe and stable operation of the whole electric system. The roadmap will address needs in terms of rules, hardware and software to face the multiple challenges caused by VRE, including: (i) technological issues to be handled such as fault ride through capability, power stability during and after faults, voltage control, power-frequency control, short-circuit currents, inertia; and (ii) challenges associated with variability of wind and solar resources, including backup power, energy niche for conventional power plants, spilled energy, upwards and downwards ramps, forecast errors, network developments. IFC is also financing a study to establish a transparent process for connecting IPPs, including a methodology to define connection costs[36] to be charged to IPPs and rules and procedures governing connection requests to STEG.

B. Detailed description of investments under component 1

6. Table 1 summarizes activities and costs under component 1. Specific investments include:

(i) Construction of 284 km of high-voltage (HV) transmission lines, including 192 km of 400kV double-circuit lines and around 92 km of 225 kV single-circuit lines. These will connect the Skhira site, which is mid-way between the southern and the central regions, with the central corridor and Sfax (the second largest city in Tunisia) respectively;
(ii) Construction of 100 km of 225 kV single-circuit line to connect the Borj Bourguiba PV IPP;
(iii) Construction of a new 400/225 kV substation at Kondar to connect the new 400 kV Skhira-Kondar line with the existing 225 kV central corridor; and
(iv) Reinforcements of existing substations at Thyna (225/150 kV) near Sfax and Tataouine (225 kV) through the installation of new lie bays and/or transformers.

7. An unallocated amount is set aside to accommodate price and technical contingencies that may affect investments.

Table 1: Component 1 activities and costs

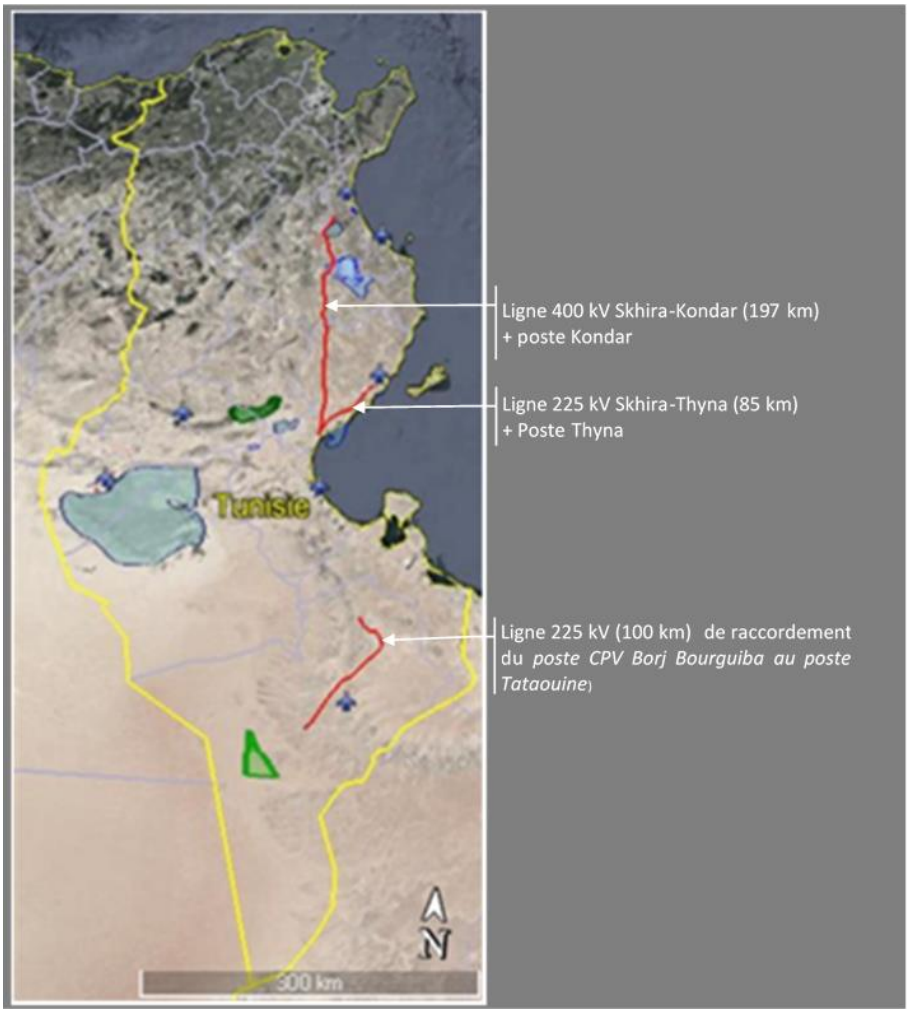
No.	Description	Voltage	Length (Km)	Cost (US$M)
1	New 225 KV line to connect the Borj Bourguiba PV plant and additional 225 kV line bay to the Tataouine substation	225 kV	100	15.5
2	New 225 kV line (411mm²) to connect the Skhira site to existing Thyna substation (near Sfax)	225 kV	85	18.6
3	New 400 kV double line (bundle 2 x 570 mm²) to connect the Skhira site to new Kondar substation on the major central corridor	400 kV	192	53.8
4	Line in-Line Out on the existing 225 kV line Bouficha-Sousse to connect on new substation Kondar	225 kV	6.5	1.8
5	New 400/225 kV substation at Kondar with three Auto-Transformers 400/225/11 kV (400 MVA) and two reactors of 40 MVAR each	400/225 kV	-	27.0

[36] These include costs associated with the needed strengthening of transmission and distribution facilities.

6	Extension of the existing Thyna substation by adding Auto-Transformers 225/150 kV (200 MVA) and 225 kV line bay	225/150 kV	-	6.0
7	Unallocated funding			8.3
			Total	**131.0**

8. Figure 1 provides a map of the project investment locations (transmission lines painted in red are those to be financed under the Project).

Figure 1: Project locations



9. The 400 kV Skhira-Kondar and the 225 Skhira-Thyna lines will be double-circuit lines of vertical configuration with the two circuits equipped. The 225 kV line connecting the Borj Bourghiba PV plant will be a single-circuit line of horizontal configuration. The towers will be of lattice type, with conductors arranged in two vertical planes for the 400 kV line and in a horizontal plane for 225 kV lines. The number and type of towers (suspension, angle, and dead end) will be identified on a conventional basis, based on the final line routing selected through the detailed studies to be carried out by contractors, but with clear instructions that if found to be economical, they may combine one or more designs into a single

type. To reduce voltage and current asymmetry during normal operation, phase transpositions shall be provided. The type of line conductors (570 mm² aluminum alloy – AAAC) has been chosen so as to allow: (i) satisfactory radio interference, audible noise, and corona loss performances; (ii) transferring maximum power at nominal voltage in normal conditions as well as in emergency situations affecting one circuit, where there is a double circuit system; and (iii) satisfactory line safety considering the loads from wind pressure.

10. Since a transmission line has a life expectancy beyond 50 years and energy demand is difficult to predict over such a long period, the selected conductors have the capacity to cope with the expected load growth over the long term. The lines will be equipped with two ground wires, one of them (the line that is installed between the HV electricity pylons) with 48 optic fibers (OPGW) that will provide grounding and communication capabilities. Two different types of guard wires shall be used: (a) ACSR type cable; and (b) OPGW type cable. The OPGW with optic fiber will provide protection to the HV line from lightning strikes and allow high-speed transmission of data to support teleprotection and remote control of the electrical network, as well as communication. The optic fiber network will provide an additional benefit by enabling telecommunications. Indeed, optic fiber is available for renting to public communications enterprises and is much needed in the southern regions.

11. Construction and reinforcement of sub-stations includes:

(i) Construction of the 400/225 kV Skhira substation with: (i) two-line bays 400 kV and two-line bays 225 kV; (ii) three-line bays 400 kV with auto-transformers 400/225/11 kV [400 MVA]; and (iii) two reactors of 40 MVAR each. The sub-station will be of the outdoor open-terminal type, with a control building containing all the auxiliary equipment. The busbars will be air-insulated tubular aluminum, in a single busbar, designed for future extension to a double busbar. The breakers will be insulated with sulfur hexafluoride (SF6) and mechanically tripped through a motor set spring.
(ii) Reinforcement of the 225/150 kV Thyna substation: the scope of works will include: (i) two new line bays 225 kV and one inter-bus bay; (ii) one transformer bay 225 kV with one auto-transformer 225/150 kV – [200 MVA]; and (iii) one transformer bay 225 kV for the existing Thyna substation.
(iii) Reinforcement of the 225 kV Tataouine substation with one-line bay 225 kV.

12. Each sub-station will be controlled by a built-in SCADA, which will enable control either locally or remotely by a control center. Communication links for the centralized system will be set up either by means of a carrier line or by fiber optic. The specific scope of work and related contracts associated with this sub-component include

13. **Benchmarking of transmission lines' and substations' costs**. Project cost estimates are based on the network study carried out by STEG in 2018. Such estimates have been appraised using the Cost Benchmark Tool (CBT) developed by Fichtner and financed by the World Bank. This is a cost estimation tool for alternating current high-voltage overhead transmission lines with voltages of 66 kV and above. The cost per km will depend on various input parameters such as the location and country factors. In particular, the cost is very sensitive to location parameters, including the easiness of access to the line route (existing road and accessibility from port area), the characteristics of the line routing and profile (winding routing, and hilly terrain) and the quality of the soil. The cost will also depend on other aspects, such as the business environment, logistics, and country's safety, stability and governance. The results of the based on the CBT and different simulations are summarized below.

	STEG Cost estimation (k$/km)	CBT Cost estimation (k$/km)
225 kV line-Single circuit	167	150 to 170
225 kV line-Double circuit	219	200 to 220
400 kV line-Single circuit	280	280 to 310

14. For substations, the cost, which was benchmarked against similar projects, will depend mainly on the scope of works and technical specifications such as voltage level, rating of transformers and reactors. Assumptions and results are presented below.

Assumptions:		STEG Cost estimation ($'000)	Benchmarking Cost estimation ($'000)
Line bay 225 kV= $800K Line bay 150 kV= $500K Line bay 400 kV= $1300K Auto-Transformers 400/225/11 kV (400 MVA) = $3900K Reactors of 40 MVAR = $731K Auto-transformers 225/150 kV (200 MVA) = $1550K	Construction Kondar substation	27,000	28,500
	Reinforcement Thyna substation	6,000	6,500

15. In conclusion, cost estimates are deemed to be in line with current market prices. Nonetheless, STEG is undertaking a review of project costs and notably price contingencies. Thus, estimates are bound to change ad will be reassessed by the Bank.

C. Detailed description of component 2

16. The main objective of *Component 2: Improving the commercial performance of STEG (US$20 million)* is to reduce the commercial and collection losses, which, in turn, will lower the cost of electricity service and the need for government subsidies. As a result, there will be less pressure for tariff increase to achieve cost recovery. In addition, the improved efficiency of its commercial practices will strengthen STEG's relations with its customers and contribute to better customer satisfaction. This component is DLI-based and therefore the financing is disbursed upon achievement of identified results as detailed below. The DLIs are phased along the five years of project implementation and require the following actions:

(i) ***Installing smart meters for HV and MV customers***. This is part of the SGP implementation. The focus of the DLI is to ensure that smart meters are installed to all high-value (HV and MV) customers. Although representing only 0.5% of STEG customers, these customers account for 56% of total electricity consumption. As there are only around 19,000 HV/MV customers, the installation of smart meters can be done in a short period and at relatively low cost while yielding significant results. The smart meters will allow for real-time monitoring of consumption by HV and MV customers, strengthening the efficiency of dispatch and demand management. This would also allow STEG to immediately detect anomaly and fraud and treat them in a timely manner (e.g. disconnecting remotely customers suspected of theft or non-paying customers). As a result, commercial and collection losses for this consumption segment could decrease significantly. It should be noted that a large share of these customers produces electricity through cogeneration and solar PVs on site, which, when exceeding consumption, is injected into the grid. Thus, incorporating smart metering for these customers would help facilitate integration of behind-the-meter renewable generation, as well as enable STEG to better manage demand. This activity will yield climate co-benefits under the eligible mitigation activity of Category 1.3 "New information and communication technology, smart-grid and mini-grid to facilitate integration of renewable energy into grids".

(ii) ***Integrating large LV customers into the revenue protection program***. Currently all HV and MV customers are covered by a revenue protection program (RPP), which is meant to secure revenues from this high-value segment.

Specifically, customers under the RPP receive special treatment in terms of customer management (direct services with dedicated staff) and more regular meter reading (monthly instead of quarterly) and billing (monthly instead of bimonthly). These actions, which are critical to reduce commercial and collection losses, will be extended to around 17,600 LV customers with a consumption above 1750 kWh per month, who account 8 percent of total consumption. Thus, the coverage of the RPP program will expand from 56 to 64 percent of total consumption.

(iii) ***Increasing the collection rate of non-governmental customers***. The ongoing ESMAP TA is assessing STEG's commercial processes and will provide recommendations to improve metering, billing, collection, and customer service practices. STEG will adopt some of the identified measures to improve collection rates among private customers. These includes: digitalizing the billing and collection processes (e.g. sending the bills through SMS/email and encouraging customers to pay online); shortening the currently long payment deadline; accelerating the treatment of customer complaints regarding the bill; and applying disconnection policy more systematically.

(iv) ***Reading the LV meters with hand-held devices***. The current meter reading practice still involves manual recording, which is prone to human error, is difficult to verify, and complicated to transfer to the central data management system. As a result, the billing process can take long; the frequent mistakes are contested by customers, causing dissatisfaction and increasing the burden of treating customer complaints, hence prolonging the collection process. The provision of hand-held devices can eliminate all these issues. It is important to note that this measure is a transition mechanism while smart meters are rolled out over the next 10 years or more (when meters can be read remotely). Yet, it is still needed since it can provide immediate benefit at a relatively low cost (the estimated cost for the hand-held devices for all meter readers is US$0.3 million).

(v) ***Launching communication campaigns***. In addition to strengthening customer service (including grievance regress mechanism and management of customer complaints), STEG will carry out communication campaigns targeting regions with high rate of fraud and non-payment, to raise awareness (of men and women) about customer rights and responsibility. This will include information about STEG's measures to provide better customer service (such as channels for customers to monitor STEG's performance, send and track their complaints, estimating and understanding their bills) as well as penalties for fraud and nonpayment by customers.