



# Project Information Document (PID)

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**BASIC INFORMATION**

**A. Basic Project Data**

Country Tanzania	Project ID P169561	Project Name Zanzibar Energy Sector Transformation Project	Parent Project ID (if any)
Region AFRICA	Estimated Appraisal Date 02-Mar-2020	Estimated Board Date 30-Apr-2020	Practice Area (Lead) Energy & Extractives
Financing Instrument Investment Project Financing	Borrower(s) Ministry of Finance and Planning of the United Republic of Tanzania	Implementing Agency Ministry of Land, Housing, Water and Energy (MoLHWE), Zanzibar Electricity Corporation (ZECO)	

Proposed Development Objective(s)

The project development objective is to expand access to efficient and reliable electricity services and to create an enabling environment for private sector participation in the Zanzibar electricity sector.

Components

Enabling infrastructure for enabling solar power plants development with private sector participation  
Grid extension, reinforcement, rehabilitation, modernization, and access scale-up  
Technical assistance, capacity building, and project implementation support

**PROJECT FINANCING DATA (US\$, Millions)**

**SUMMARY**

<b>Total Project Cost</b>	145.00
<b>Total Financing</b>	145.00
<b>of which IBRD/IDA</b>	117.00
<b>Financing Gap</b>	0.00

**DETAILS**

**World Bank Group Financing**

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International Development Association (IDA)	117.00
IDA Credit	117.00

**Non-World Bank Group Financing**

Trust Funds	28.00
Clean Technology Fund	28.00

Environmental and Social Risk Classification

Substantial

Decision

The review did authorize the team to appraise and negotiate

Other Decision (as needed)

**B. Introduction and Context**

Country Context

1. **Tanzania, with rich endowment of natural resources, has enjoyed relatively stable economic growth in the past decade.** Tanzania has experienced a strong and steady growth rate in its Gross Domestic Product (GDP) of 6.7 percent per annum between 2006 and 2016, higher than the average growth for Sub-Saharan Africa of 4.8 percent during the same period.<sup>1</sup> The services sector is the main contributor to the GDP (about 46 percent).<sup>2</sup> Agriculture remains an important economic driver, accounting for more than 25 percent of GDP, 85 percent of exports, and employing about 65 percent of the work force. Real GDP growth is projected to rise gradually over the medium term, assuming modest but steady implementation of reforms, especially for improving the business environment and fiscal management. The Debt Sustainability Analysis conducted by the IMF in 2018, indicated that Tanzania remains at “low” risk of external debt distress. The public debt-to-GDP ratio was estimated at 40.1 per cent in 2018.

2. **Over the past decade, Tanzania has registered a decline in national poverty levels, but the gains have been undermined by population growth and low growth elasticity of poverty.** The population in Tanzania was about 56 million (2016) and is expected to almost double to 100 million by 2040. The population growth rate has undermined the reduction in poverty. Between 2007 and 2016, the national poverty rate reduced from 34.4 percent in 2007 to an estimated 26.8 percent,<sup>3</sup> however the head count of those living in extreme poverty remained at about 13 million during the same period. The growth elasticity of poverty has remained at less than unity, which means that a 1 percent increase in economic

<sup>1</sup> World Bank CPF for Tanzania for the period FY2018–2022.

<sup>2</sup> Tanzania Economic Update, 12<sup>th</sup> Edition, World Bank, 2019.

<sup>3</sup> The poverty rate based on the US\$1.90 per day global poverty line declined from 60 percent to 47 percent over the same period.

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growth reduces the poverty headcount by less than 1 percent. It appears economic growth is not generating enough opportunities for the poor to make their assets more productive and increase their incomes.

3. **Zanzibar is a semi-autonomous region of the United Republic of Tanzania.** Zanzibar has its own legislative assembly, judicial system, and an executive headed by the President.<sup>4</sup> The Zanzibar archipelago consists of two main islands, Unguja and Pemba. The two islands are located roughly 35 kilometers (km) off the coast of Tanzania and are surrounded by a group of approximately 50 islets. In 2012, Zanzibar's population was 1.3 million, 900,000 in Unguja, and 400,000 in Pemba. Zanzibar has a total area of 2,461 square-km representing 0.3 percent of Tanzania's total area. By 2020, Zanzibar's population is expected to increase to 1.6 million people, given an estimated population growth rate of 3.1 percent per year.<sup>5</sup> Currently, over 60 percent of the inhabitants live in urban areas, and the population density is more than ten times higher than on mainland Tanzania and its urbanization rate is twice as much as the national average (33 percent).

4. **Zanzibar's growth trajectory has been similar to the national trend, albeit slightly lower by about 0.3 percent.**<sup>6</sup> Zanzibar exhibits strong economic prospects but also potential economic vulnerabilities. In 2017, the estimated GDP of Zanzibar was US\$1 billion. This was mostly driven by services, particularly tourism and related services.<sup>7</sup> Zanzibar, once the largest producer and exporter of cloves in the world, still relies on exports of agricultural products – cloves and other spices, seaweed, and coconut products, but tourism growth is outpacing all the other sectors. Agriculture was traditionally the backbone of Zanzibar's economy, but tourism has become the main growth driver, contributing to more than a quarter of the GDP and most of the foreign exchange earnings. The number of tourist arrivals has more than doubled over the last decade, reaching about 400,000 arrivals each year. The sector also provides the highest private sector employment. However, due to heavy dependence on imported goods, the fiscal situation in Zanzibar is vulnerable to the changes in the price of oil and other imports. With a growing population, a high fertility rate, and a lack of adequate job creation, unemployment is increasingly a pressing economic and social problem. The unemployment rate rose from 5.5 percent to 2006 to 14.3 percent in 2014.

5. **Over the past years, Zanzibar registered a modest decline in poverty.** In 2015, around 30.4 percent of the population lived below the basic-needs poverty line, down from 34.9 percent in 2010. The decline in poverty was mainly in Unguja (18.4 percent from 26 percent). This was mainly driven evident in the larger urban centers in Unguja, where more than 60 percent of the population lives. Pemba experienced an increase in poverty (55 percent from 48 percent). In contrast more than 80 percent of the population in Pemba lives in rural areas. Most of the rural households depend on fishing and agriculture for their livelihood and spend on average 18 percent of their incomes on energy, water, and housing. With a median age of 17 years, Zanzibar has a young population, signifying the potential for demographic dividends. However, rapid population growth has impeded poverty reduction and posed challenges for youth employment and provision of social services.

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<sup>4</sup> Tanganyika (Tanzania-mainland) and Zanzibar formed a unity on April 26, 1964 through the Union of Tanganyika and Zanzibar Act of 1964, which led to the formation of the United Republic of Tanzania.

<sup>5</sup> Tanzania-Zanzibar National Population Projections, February 2018. It is estimated that the population will reach 1.6 million inhabitants in 2020, 1.76 million in 2022 and 2.3 million in 2035.

<sup>6</sup> World Bank (2017). Tanzania CPF FY18-22.

<sup>7</sup> Bank of Tanzania Annual Report 2017/18



6. **The Zanzibar Strategy for Growth and Reduction of Poverty 2016-2020 (ZSGRP III) prioritizes the tourism sector and enabling infrastructure such as energy, water, transport as key drivers of economic growth and poverty reduction.** The RGoZ's high-level objectives for the development of the energy sector are stated in Vision 2020 and the Energy Policy (2009) under the overarching umbrella of ZSGRP III. The Vision 2020 emphasizes the development and efficient utilization of Zanzibar's locally available energy resources to minimize dependency on imported energy and reduce pressure on natural forests. These documents focus on (i) expansion of generation capacity using sustainable and clean energy sources, and extension/strengthening of the distribution network to meet the growing demand and to serve more customers and (ii) increase of new customer connections, with a focus on women.

## Sectoral and Institutional Context

### Sector governance

7. **The Zanzibar power sector comprises of three key institutions.** The Ministry of Land, Housing, Water and Energy (MoLHWE), the Zanzibar Utilities Regulatory Authority (ZURA), and the vertically integrated utility, the Zanzibar Electricity Corporation (ZECO) are the main actors in the power sector. There is no independent power producer in Zanzibar.

- (a) **MoLHWE.** The Department for Energy and Minerals (DoEM) within MoLHWE is responsible for overall sector coordination, planning, and policy. The ministry through the DoEM is responsible for supervising the implementation of the energy policy and overseeing the functioning of ZECO and appointing its Board of Directors.
- (b) **ZURA** is responsible for technical and economic regulation in the water, petroleum, and electricity sectors. ZURA's functions include tariff setting and review, licensing and quality of service regulation, promoting economic efficiency and performance monitoring of sector utilities, and promoting private sector participation. Although established under the ZURA Act (2013), ZURA is not yet fully operational. It is in the process of developing the requisite institutional capacity to fully undertake its mandate by the end of 2020. ZURA has recently completed its first cost of service study (CoSS) for ZECO to inform the RGoZ on the total costs incurred by ZECO in providing electricity service to the different customer categories. Currently any changes to retail electricity tariffs proposed by ZECO are approved by the Cabinet of Ministers of Zanzibar.
- (c) **ZECO** is vertically integrated utility that is fully owned by the RGoZ through the MoLHWE. Its responsibilities include generation, transmission and distribution, and the sale of electricity on both Unguja and Pemba. The ZECO Act (2006) gives the utility the mandate to sign Power Purchase Agreements (PPAs) with any public authority or independent power producer (IPP) for the bulk purchase of electricity. The utility is supervised by a five-member Board of Directors whose chairperson is appointed by the President of Zanzibar. The General Manager, who is also appointed by the President, is ex-officio a member of the Board of Directors. The other three members are appointed by the MoLHWE and ZECO management team. ZECO is headquartered in Unguja, with a separate department in Pemba. The utility currently has 756 employees across seven departments and four units.



8. **The power sector regulatory and policy frameworks continue to evolve and strengthen.** The sector is governed by three key legislation: (i) the Zanzibar Electricity Corporation Act (2006) under which ZECO was established together with its key functions; (ii) the Energy Policy (2009) that lays out the long-term priorities and targets of the RGoZ for the energy sector, (iii) the ZURA Act (2013) under which ZURA was established, together with its key functions in relation to the petroleum, water and electricity sectors. An Electricity Act is currently being finalized and is expected to be approved during the calendar year 2020. This will fill an important gap in sector regulation including giving ZURA the necessary authority for regulatory oversight of the sector. Existing sector regulations will be harmonized to the Act as necessary. The Energy Policy is also being revised to better reflect sector needs. Together these legislations will provide the necessary legal and regulatory framework to enable private sector participation in electricity generation.

9. **To support the implementation of the Public Private Partnership Policy (2014), the RGoZ has enacted the Public Private Partnership Act (2015), and the Public Private Partnership Regulations (2017), along with other relevant regulations.** While the concept of Public Private Partnerships (PPP) is nascent in Zanzibar, the RGoZ envisions a long-term strategic plan of increasing private sector participation in the finance, design, construction, operation and maintenance of critical infrastructure services. Several PPPs in different sectors, including energy are currently under consideration. According to the Union of Tanganyika and Zanzibar Act, 1964,<sup>8</sup> energy is not a union matter, and Zanzibar has autonomy on sector-related decision-making, including PPPs. However, the supply of electricity in Zanzibar is fully dependent on power generated from mainland-Tanzania. Clear links, if any, to the policies and regulations governing PPPs in Tanzania-mainland must also be considered.

#### Supply and demand profile

10. **The two main islands of Zanzibar are dependent on power imported through submarine cables from mainland-Tanzania.** Unguja imports its power from TANESCO through a 39km, 132kV submarine cable with a maximum capacity of 100MW, that was commissioned in March 2013.<sup>9</sup> The new cable was constructed to replace the old 132kV (45MW) oil filled submarine cable, installed in 1980, which was reaching its limits both in terms of capacity and lifetime. The old cable had started experiencing breakdowns leading to prolonged blackouts on Unguja and causing considerable losses on the island's economy. Pemba imports its power from TANESCO through a 75km, 33kV submarine cable, with a maximum capacity of 25MW, that was commissioned in 2010. The commissioning of the 33kV Pemba submarine cable helped displace expensive and unreliable diesel-based power generation.

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<sup>8</sup> The 1964 Act provides main foundation of the Constitutions of the United Republic of Tanzania of 1977 and the Zanzibar Revolutionary Government of 1984. The Articles of the Union were signed on April 22, 1964 by the Founders of the Union, Julius Nyerere and Abeid Amani Karume and agreed in 11 matters which later increased to over 22 and are the source of tension and dispute between Tanzania-mainland and Zanzibar.

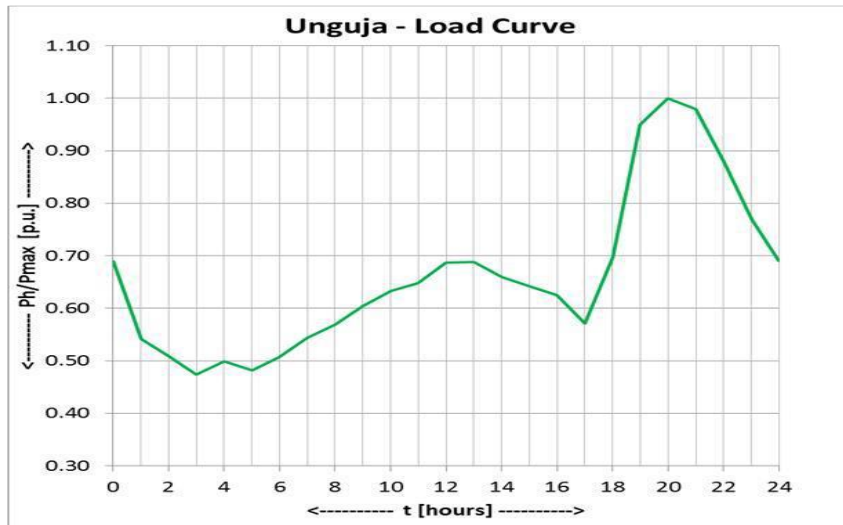
<sup>9</sup> TANESCO is the vertically integrated power utility in mainland Tanzania that is responsible for power generation, transmission, distribution, and sales.



Figure 1.1: 132kV Unguja submarine interconnection  
Source: Zanzibar Interconnector 132kV submarine cable in Tanzania, Viscas Corporation and ESB-International, 2015

11. **In December 2009, Unguja experienced island-wide blackout lasting 3 months due to a fault on the submarine cable.** This followed a month-long blackout in May 2008, due to a wide area grid failure on the TANESCO grid. The extended blackouts had an immense negative impact on the island’s economy. Although the new submarine cables on Unguja and Pemba have improved reliability of supply, the risk of supply outages remains due to dependence on a single submarine cable. As a partial mitigation against this risk, ZECO owns 25MW of grid-connected back-up diesel generators on the Island at Mtoni sub-station. These however, have not been adequately maintained over the past years and are considered very expensive to even run as stand-by.

12. **Demand for electricity is growing rapidly in Unguja and will exceed the available capacity on the existing 100MW submarine cable in the next two to three years.** Driven by economic growth and the tourism sector, electricity demand on the Unguja has registered rapid growth in recent years – an average of about eight percent per year between 2014 and 2018. In 2018, electricity consumption was 371 GWh, implying a per capita consumption of about 285 kWh – more than double that of 2009. The evening peak demand, occurring between 6pm and 10pm, is about 25-30 percent higher than the afternoon load. In August 2019, on Eid, the recorded peak demand for Unguja was 85 MW.



Source: Preliminary Feasibility Studies for Wind Parks, Solar Farms and Solar Home Systems, 2017, European Union

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13. **Only 50 percent of the population has access to electricity in Zanzibar.**<sup>10</sup> The RGoZ has set the objective of universal access by 2032. Currently, the grid infrastructure covers about 82 percent of the population. This implies that over 30 percent of the population lives “under the grid” without access to electricity. This also represents the underutilization of existing infrastructure. The charge for connection to the grid is a significant barrier to increasing access, even where the electricity grid is available. Currently, ZECO connection charges are about TZS300,000 (US\$133) for a “no-pole” connection and increase proportionately with the number of poles needed for a connection.<sup>11</sup> In recognition of this barrier, ZECO has adopted a scheme to allow customers to pay for connection fees in installments over time. However, this is not systematically implemented and has not eliminated the barrier as some customers are still unable to afford the installment payments allowed under the ZECO scheme.

14. **Zanzibar has promising solar resources that have not yet been exploited.** An EU solar feasibility studies of five identified solar farm sites in Zanzibar (Michiweni, Muwambe, Matemwe, Pongwe, Makunduchi) showed an average Global Horizontal Irradiation (GHI) of 2100 kWh/m<sup>2</sup>/yr, which is identified as favorable for PV applications. With a comparable GHI, the Maldives is developing substantial solar and BESS investment pipeline, that is helping the islands reach a carbon neutral goal by 2020. Like Zanzibar, the Maldives’ economy is tourism-driven. Global experiences show that tapping the underdeveloped solar resources in tourism dominated islands benefits both the energy access and climate agenda, which eventually helps boost economic growth.

Electricity Network Characteristics

15. **The existing backbone network on Unguja and Pemba comprises 33kV and 11kV radial distribution lines, in addition to the 132-kV submarine transmission line connecting Unguja to mainland-Tanzania.** The network on Unguja comprises of 621km of 33kV lines and 119km of 11kV lines, while Pemba has 293km of 33kV lines and 114km of 11kV lines. Stone Town in Unguja, has about 30km of underground 11kV cables. The 132kV transmission infrastructure spans a total 76km submarine (39km)

<sup>10</sup> This is how the RGoZ defines as “connectivity”.

<sup>11</sup> Any addition wooden pole translates into additional cost of between about TZS 800,000-1,000,000.





and overhead (37km) lines from the Ubungo sub-station near Dar es Salaam to Mtoni substation on Unguja (the main 132/33kV substation on the island) (see figure 1.1). There are four main substations in Unguja: one 132/33/11kV at Mtoni and three 33/11kV substations.

16. **The network on Unguja comprises of long, often poorly maintained, 33kV and 11kV radial distribution lines with suboptimal configurations.** These lines extend over long distances and are not configured to isolate and localize faults to prevent widespread supply interruption. Further, due to this configuration, the network is fraught with high technical losses, reliability and power quality issues. About 60 percent of ZECO's transformers are overloaded and have distribution network feeders that are often longer than technically optimal.

17. **The frequency of power outages is high and has adverse impacts on commercial and residential consumers.** The average number of unplanned outages were 93 and 54 per month in 2018 on Unguja and Pemba, respectively.<sup>12</sup> Both planned and unplanned last for an average of total 75.8 hours per month. The frequent outages impose significant costs on the tourism sector and other consumers. Many must resort to expensive back-up diesel generators, which increase their cost of doing business.

18. **Currently, overall system losses are estimated at 19 percent.** While ZECO has been successfully reducing commercial losses, technical losses remain high. These losses are a significant source of inefficiency in ZECO's operations and require system upgrade and improved reconfiguration to address. ZECO has a set a target to reduce technical losses and improve supply efficiency through undertaking priority investments identified in the Electrification Master Plan (2017).

#### Commercial Status

19. **ZECO buys power from TANESCO under separate Power Purchase Agreements (PPAs) for Unguja and Pemba, however a new combined PPA is being negotiated.** The PPA for Unguja was signed in 2010, while the one for Pemba was signed in 2008. ZECO pays TANESCO a bulk-supply tariff that is based on the regulated tariff for high-voltage large industrial consumers (Category T3) in Tanzania-mainland. The regulated tariff consists of an energy (per kWh) charge and a demand (max kVA per month) charge.<sup>13</sup> For Unguja, the energy charge is subject to a 31 percent discount on the regulated EWURA tariff, that was agreed to in 2014, and amounts to TZS104.8 per kWh. The demand charge has been a subject of protracted negotiations between ZECO and TANESCO, where the amount currently being paid (TZS8,647 per kVA/month) is substantially lower than the tariff regulated by EWURA (TZS16,550 per kVA/month). Based on actual tariffs paid by ZECO, the effective cost of purchasing power from TANESCO was TZS134.4/kWh (US\$6/kWh) in 2018 (based on assumed average monthly peak). ZECO and TANESCO are currently negotiating a new tariff structure and a new combined PPA for both Unguja and Pemba. The expectation is that the demand charge will be eliminated and instead a higher energy tariff will be agreed to.

20. **ZECO returned a net operating profit during the financial year 2018.** Financial sustainability of ZECO is primarily driven by the difference between cost of bulk power supply and revenue from sales. ZECO's capital expenditure (CAPEX) is mostly funded through grants from development partners and the RGoZ (for rural electrification programs). The utility depends primarily on electricity sales for its revenues, with around 17 percent of total net revenues related to penalties, reconnection fees, and amortization of

<sup>12</sup> ZECO Masterplan-approved July 2017

<sup>13</sup> There are separate PPAs for Unguja and Pemba. The demand charge is only for Unguja, Pemba PPA only has an energy charge.



grants. In FY-2018 the total cost for supplying one unit of electricity (kWh) was TZS235 (US\$10.4) made up of TZS158.5 (US\$7) of bulk power purchase and TZS76.6 (US\$3.4) of operational expenditure (OPEX). During the same period, ZECO's net operating income amounted to TZS16.647 billion (US\$7.3 million), and it generated a net profit of TZS14.646 billion (US\$6.5 million). Despite this, at the present tariff levels, future network investments will continue to rely on government budget transfers and development partner assistance. More details on the financial situation of ZECO are provided in Annex 3.

21. **ZECO had accumulated substantial payment arrears to TANESCO but has largely paid them down over the past two years.** According to ZECO, in January 2017, accumulated arrears to TANESCO were TZS65.6 billion (US\$29million).<sup>14</sup> A payment plan has since been put in place by ZECO and ZMoFP to pay off the arrears through monthly payments of TZS1 billion (US\$440,000). The arrears have now reduced to TZS13.6 billion (US\$6million) and expected to be fully paid off by December 2019. ZECO's payable arrears are closely related to its receivable arrears – especially from large government customers such as the Zanzibar Water Authority (ZAWA). ZAWA is ZECO's largest customer, accounting for about 10 percent of revenue share. ZAWA's arrears to ZECO in September 2019 were TZS25 billion (US\$11million).

22. **ZECO is implementing a program to reduce commercial losses.** ZECO is currently replacing post-paid meters with pre-paid meters for all residential and small commercial customers. As a result, about 90 percent of ZECO's 180,000 customers are now on pre-paid meters and contribute over 65 percent of the billing revenues. For larger industrial customers and hotels, ZECO is investing in Automatic Meter Reading (AMR) systems. Supported under a technical assistance program funded by Swedish International Development Cooperation Agency (Sida), ZECO is rolling out 130 AMR meters to a subset of large customers. The AMR meters are expected to improve ZECO's ability to detect misuse and billing discrepancies, reduce operational costs related to meter reading, and help further reduce commercial losses.

23. **The RGoZ is seeking to address three key challenges for the sustainable development of the Zanzibar power sector.** These are (i) the sole reliance on the limited submarine transmission capacity, as an obstacle to meeting rising energy demand and compromised energy security from the risk of power outage from the mainland; (ii) the poorly configured and often dilapidated distribution system causing high technical losses, thereby preventing the reliable and efficient service of increased power load and scale-up in electricity access; and (iii) low institutional capacity constraining system modernization to improve operational efficiency.

24. **The RGoZ plans to develop domestic renewable energy (RE) resources to diversify supply and address energy security concerns.** The RGoZ launched a wind and solar resource measurement exercise in 2013, with the support of the European Union. The preliminary feasibility study, following the resource measurement, recommended the development of Solar PV plants on Unguja and Pemba. The RGoZ Cabinet of Ministers, in December 2018, issued a decision to adopt a PPP approach for the development of solar PV on Unguja. Following this, a rapid assessment of PPP options was undertaken, with support from Sida. The study recommended a PPP/IPP approach to solar development procured through a competitive auction design and recommended the consideration of storage to enable evening peak shaving to enable longer use of the submarine cable. While the solar PV is being developed, ZECO is also exploring more short-term options to meet the growing demand. ZECO is assessing the rehabilitation of the old sub-marine cable, which is now rated at 40 MW, to serve the load in Stone Town, while the 100MW

<sup>14</sup> Though in some news articles, TANESCO reports the arrears were double this at about TZS125billion.



cable will continue to serve the rest of the island.<sup>15</sup> However, it is not clear when the cable might be in operation and what lifetime is expected for it, and it is unlikely to be a reliable long-term option.

25. **The RGoZ is assessing the deployment of a battery energy storage system (BESS), to help “shave” the evening peak electricity demand, and facilitate integration of Solar PV in Unguja.** With the sub-marine cable reaching the maximum rated capacity during the evening peak load, the BESS will provide important peak shaving benefits which would reduce the near-term requirements of supplying the peak demand through diesel gensets and defer possible investment in additional sub-marine transmission capacity. A BESS can also provide transformative benefits to the system both as a standalone asset and coupled with RE as follows: i) BESS are modular and could be installed in phases and/or scaled up depending on the needs of the system; ii) These systems can be installed at any specific location in the system whether it be on the Mtoni substation or next to the solar PV plants; iii) the BESS systems can provide load following capabilities to smoothen the variability of the plant; iv) BESS systems can provide flexibility to the system including support for islanding operation of the grid. In the case of the scenario where solar PV is developed without BESS installations, this would mean that the solar PV plants would have to be disconnected when the mainland supply through the submarine cable is disrupted.

26. **ZECO plans to construct a 132-kV transmission backbone for Unguja which will increase its ability to supply loads in the North and South of the island efficiently and reliability.** The high voltage line will connect the growing loads in the North and South of the island with the Mtoni substation, and the 132kV line from the mainland. The transmission backbone will help relieve the pressure on the overloaded distribution system, and help significantly reduce technical losses, improve supply efficiency. Complementary upgrade in distribution infrastructure, identified in ZECO’s EMP, will also strengthen the distribution network and improve reliability and efficiency of power supply. Priority investments in upgrade of equipment, improved configuration and protection would help reduce incidence of outages that are all too frequent, including those in the rainy season when equipment sometimes get wet or flooded.

27. **The RGoZ has set the target for universal access in Zanzibar by 2032.** The expansion and strengthening of the network will enable connection of additional customers to expand access to electricity. Apart from the infrastructure barrier, access acceleration will require some measures to address the demand side affordability constraints, including connection charges. With a goal to increase electricity access, mainland Tanzania has eliminated the connection charge paid by new customers. New customers are only required to pay the associated value added tax (VAT) for connections to TANESCO’s grid. A similar approach will be assessed by the RGoZ, in line with the affordability objectives of the Energy Policy, and an appropriate policy response will be designed and implemented.

28. **Institutional strengthening has been a key area of focus for the Zanzibar power sector over the past few years.** Capacity strengthening of ZECO in areas of commercial loss reduction, outage management and corporate management systems has resulted in increased efficiency. The formation and operationalization of ZURA, and accompanying regulations has put in place the necessary regulatory frameworks. Despite the gains, institutional structures are still very new and significant institutional strengthening is needed to sustainably manage the increasingly complex power system.

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<sup>15</sup> According to ZECO the old cable is currently energized but not loaded. Rehabilitation will involve replacing the oil used for insulation, rehabilitating the oil pumps on both side of the water channel and a reconfiguration of the connection of the cable to 11kV grid serving Stone town.



### Support of Development Partners in the Sector

29. Development partners, including Millennium Challenge Corporation (MCC), Sida, Japan International Corporation Agency (JICA), the European Union (EU) and Norad, have been closely supporting the Zanzibar electricity sector. The MCC compact (2008-2013) supported the construction of the new submarine cable that has substantially improved power supply reliability to Unguja. Under the compact, there was also planned support to build sector institutional capacity including operationalization of ZURA, financial strengthening of ZECO and other sector reforms. After the exit of MCC following the 2013 general elections, other DPs picked up some of the activities planned by MCC. Sida has supported the Zanzibar power sector through the Zanzibar Energy Sector Strengthening (ZESS) project. Under ZESS, Sida is supporting improved operational efficiency at ZECO (e.g. billing system, outage management, Automatic Meter Reading (AMR) rollout for large customers), operationalization of ZURA (cost of service study, regulatory capacity building), and drafting sector policy and legislation. Norad has also been supporting ZECO in the construction of the 33kV submarine cable between the mainland and Pemba, the rehabilitation of network infrastructure in Unguja, solar mini-grids on some of the isolated smaller islands, the Electrification Master Plan, and the needs assessment for SCADA. JICA recently supported the construction of 33kV infrastructure and substation upgrades on Unguja. The EU has been supporting the renewables development through the wind and solar resource measurement and the preliminary feasibility study of solar PV development.

### C. Proposed Development Objective(s)

Development Objective(s) (From PAD)

The project development objective is to expand access to efficient and reliable electricity services and to create an enabling environment for private sector participation in the Zanzibar electricity sector.

#### Key Results

30. **PDO level indicators are presented as follows:**

- (i) People with access to electricity (*number*);
- (ii) Reduction in system outages (*number/month*);
- (iii) BESS installed for grid support (*MWh*)
- (iv) Capacity of solar PV generation enabled by the project (MW)
- (v) Reduction in technical losses (*percentage*); and
- (vi) Direct project beneficiaries (*number*), of which female (*percentage*)

### D. Project Description

31. **The proposed project will address the key priorities in Zanzibar's power sector.** These include: (i) the impending capacity constraint on the power imported from mainland Tanzania by supporting hard and soft infrastructure investments aimed at enabling renewable energy (RE) independent power producers (IPPs) to invest in the sector, including BESS; (ii) addressing the poor supply quality and reliability of the existing electricity network, and low electricity access rate through investments in transmission/distribution network strengthening and extension; and (iii) sector capacity challenges by



providing technical assistance and capacity building support to strengthen sector governance and operational effectiveness.

32. The renewable energy IPP transaction will be developed with support of a transaction advisor to be hired by RGoZ. The transaction advisor will advise the RGoZ's final decision on the technical and financial structure of the transaction. An important area of further analysis will be potential financial risk mitigation options that may be needed to attract reputable private sector investors and ensure a competitive procurement of the IPP. This will be further clarified during preparation through IFCs engagement with the RGoZ and through the ongoing discussions on support available from other development partners. In addition, by supporting grid upgrade and enabling infrastructure, the project will help substantially reduce technical and development risks. The project support will also put significant focus on technical assistance and building necessary implementation capacity to ensure that the power sector institutions are able to carry out their responsibilities effectively and ensure sustained power sector development in the future.

33. The proposed project is structured in three components.

**Component 1: Enabling support for solar PV and BESS development with private sector participation (US\$39 million: US\$13 million IDA, US\$22 million CTF loan, US\$4 million CTF guarantee, US\$2 million CTF Grant)**

34. This component will enable a 30-50 MW solar PV IPP in Unguja, estimated to require US\$ 38.5 million in private sector financing. The RGoZ is planning to engage the services of a transaction advisor to support the design and execution of the Solar PV IPP procurement. The RGoZ is in the process of engaging IFC Advisory, under a "phase zero mandate", to carry out a market sounding and review challenges to a successful renewable auction in Zanzibar.<sup>16</sup> The plant is expected to be developed on one of the three sites already identified and owned by RGoZ – Makunduchi, Bambi, and Matemwe.<sup>17</sup> The sites have been studied as a part of the EU financed preliminary feasibility study and found to be favorable for the development of solar PV generation. The location, sizing, and configuration of the Solar PV and BESS will be informed by the recommendations of the technical analysis under the VRE Grid Integration and BESS Study, and further due diligence that will be conducted during project implementation.

35. The component will support the Solar PV IPP development through investments in the infrastructure for publicly-financed solar park infrastructure, capital expenditure for BESS, a liquidity risk mitigation facility for the Solar PV IPP, and technical assistance for technical and commercial due diligence for Solar PV and BESS. The objective is to provide critical enabling support for the development of the Solar PV and BESS to ensure a highly competitive procurement and to realize the least possible power purchase price for ZECO.

**Component 2. Grid extension, reinforcement, rehabilitation, modernization, and access scale-up (US\$91 million IDA)**

36. Component 2 under the proposed ZEST will support the implementation of the ZECO Electrification Master Plan (EMP) by financing the 132-kV transmission backbone infrastructure in Unguja, strategic MV and LV grid extension, strengthening, and modernization investments, including last mile

<sup>16</sup> The team is coordinating closely with IFC Advisory on this.

<sup>17</sup> In the south, center and north of the island, respectively.



electricity connections. The component will also support ZECO ste up a control center and install a SCADA system. The grid investments will increase the ability of the grid to reliably integrate a high proportion of VRE, evacuate greater amount of energy from any given location, improve efficiency of power supply to end customers, and expand access to electricity to unserved households. The investments under this component will modernize the Zanzibar electricity network to better harness domestic renewable energy resource and expand reliable access to electricity to its citizens.

**Component 3. Sector Institutional Strengthening and Project Implementation Support (US\$15 million IDA)**

37. This component will support the strengthening of sector institutions to improve planning frameworks and operational efficiency in the supply of electricity services in Zanzibar, including the implementation of the renewable energy generation program. The component will finance technical assistance to ZECO and sector stakeholders such as MoLHWE, MoFP, and ZURA, including relevant technical skills strengthening. This component will also support demand-side energy efficiency improvement, an integral part of the strategic response to growing electricity demand and limited supply options. The necessary approvals from Bank management will be sought to confirm the funding of this sub-component.

38. This component will support the strengthening of sector institutions to improve planning frameworks and operational efficiency in the supply of electricity services in Zanzibar, including the implementation of the renewable energy generation program. The component will finance technical assistance to ZECO and sector stakeholders such as MoLHWE, MoFP, and ZURA, including relevant technical skills strengthening. This component will also support demand-side energy efficiency improvement, an integral part of the strategic response to growing electricity demand and limited supply options.

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Legal Operational Policies

	Triggered?
Projects on International Waterways OP 7.50	No
Projects in Disputed Areas OP 7.60	No

Summary of Assessment of Environmental and Social Risks and Impacts

39. The proposed project social risk rating is classified as substantial under the World Bank ESF, based on the type of project and the nature of its activities, as well as capacity of the implementing agency. A preliminary assessment of sites proposed for the construction of the solar plants under Component 1 indicated there will be no involuntary land acquisition or physical displacement. The identified sites are owned by the government and have no physical structures. They are located at a distance from nearest settlements. Economic displacement is expected due to use of land for cattle grazing and farming of seasonal crops. Physical and economic resettlement is likely under Component 2 (Electricity Grid strengthening and Extension) due to the construction of the 132kV line, the expansion of 33kV lines, and the construction of new substations, transformers and feeders. The scale of involuntary resettlement will





be determined during preparation when the design and scope of works are finalized and the exact project sites are known. Other risks relate to community and contractor labor conditions, labor influx and gender-based violence. There may be risks of exclusion of women and other vulnerable groups from benefits and project processes such as consultations and disproportionate impact on women when land is acquired. There are also potential risks related to cultural heritage from the proposed works in Stone Town. The capacity of implementing agency to monitor social risks is relatively low.

40. The environmental risk classification of the Project is Substantial under the World Bank's Environmental and Social Framework (ESF) risks and impacts that are site-specific, which will largely occur during the construction phase of the project and the low capacity of the implementing agency (ZECO) to oversee the Environmental risks of the project. Based on a visual survey carried out during the initial site visit and the 2016 Unguja ESIA, key environmental impacts are related primarily to construction phase including: (i) Under component 2 the construction of 132kV north-south transmission infrastructure, which is likely to involve clearing of trees along the 2km stretch of Jozani National Park which is the only National Park in Zanzibar and habitat to endemic Monkeys known as Zanzibar Red Colobus. This could lead to disturbance to the monkeys and other species of importance within the National Park during the installation of infrastructure. (ii) the aesthetic and visual quality of the surrounding landscape of the project area, including disturbance geohydrological resources, flora and fauna (iii) traffic management, (iv) disposal and management of waste/spoil, (v) occupational health and safety of workers, (vi) nuisances related to air and noise emissions, and (vii) community health and safety. Measures to mitigate these risks and impacts will be included in the Environmental and Social Impact Assessment (ESIA), and its associated Environmental and Social Management Plan (ESMP) to be prepared by the Client and disclosed in-country and on the WB's external web site. Impacts from operation of solar power plant are envisaged as positive on climate and reduction of gas emissions. The relevant environmental and social safeguard instruments will be incorporated into the Environmental and Social Commitment Plan (ESCP) to be prepared and agreed with the Client as a requirement of the legal agreement that will ensure project compliance with the Environment and Social Standards and the World Bank Group (WBG) Environmental, Health and Safety (EHS) Guidelines.

## E. Implementation

### Institutional and Implementation Arrangements

41. **ZECO and MoFP will be the implementing agencies (IAs) under the proposed project.** ZECO will implement sub-component 1.2, Component 2, and sub-component 3.1, while the MoFP will implement sub-component 1.1, sub-component 3.2 and 3.3. The MoFP will coordinate implementation on behalf of MoLHWE, ZURA and ZAWA. Each implementing agency will have a PIU, headed by a project manager. Since this is the first World Bank project being undertaken ZECO and other sector agencies, substantial capacity building will be built in to project design and implementation. Necessary mitigation of any assessed gaps in implementation capacity will be included as a part of project support through a combination of training, capacity building, and hiring of embedded project staff/consultants.

42. **Given the strategic importance of the project investments, a Project Steering Committee and a Project Technical Committee has been established by the RGoZ.** The Steering Committee will be chaired by the Permanent Secretary of MoFP with membership of key sector stakeholders including MoLHWE, the



Attorney General’s Office, ZECO, and the Planning Commission. A Project Technical Committee chaired by the Director of Energy at MoLHWE has also been formed to monitor and provide guidance on technical matters related to the project.

43. **Key project investments will be implemented with supervision and monitoring support from supervision consultants.** The project includes support for supervision consultants for the solar park infrastructure, transmission and distribution investments, and the installation of the BESS. In addition, the RGoZ will bring aboard a reputed transaction advisor to support the design and procurement of the Solar PV IPP, including associated financial structuring and risk mitigation.

## CONTACT POINT

### World Bank

Kabir Malik  
Senior Economist

Mbuso Gwafila  
Senior Energy Specialist

### Borrower/Client/Recipient

Ministry of Finance and Planning of the United Republic of Tanzania

### Implementing Agencies

Ministry of Land, Housing, Water and Energy (MoLHWE)  
Ali Khalil Mirza  
Principal Secretary  
akmirza@zanlink.com

Zanzibar Electricity Corporation (ZECO)  
Hassan Ali Mbarouk  
Managing Director  
hassan.ali@zeco.co.tz





**FOR MORE INFORMATION CONTACT**

The World Bank  
1818 H Street, NW  
Washington, D.C. 20433  
Telephone: (202) 473-1000  
Web: <http://www.worldbank.org/projects>

**APPROVAL**

Task Team Leader(s):	Kabir Malik Mbuso Gwafila
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**Approved By**

Environmental and Social Standards Advisor:		
Practice Manager/Manager:		
Country Director:		

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