



# Disclaimer

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## Abbreviations

TCN	Transmission Company of Nigeria
DISCO	Distribution Companies
GENCO	Generation Companies
NERC	Nigeria Electricity Regulatory Commission
NESI	Nigerian Electricity Supply Industry
MYTO	Multi-Year Tariff Order
WAPP	West African Power Pool
NCC	National Control Center
PIP	Performance Improvement Plan
FMP	Federal Ministry of Power
PSRP	Power Sector Recovery Program
CAPEX	Capital Expenditure
OPEX	Operating Expenditure
KPI	Key Performance Indicators
NEPA	National Electric Power Authority
TSP	Transmission Service Provider
ISO	Independent System Operator
MO	Market Operator
PHCN	Power Holding Company of Nigeria
ECOWAS	Economic Community of West African States
EPSR	Electric Power Sector Reform Act
MVA	Megavolt Ampere
kVA	Kilo-Volt-Amperes

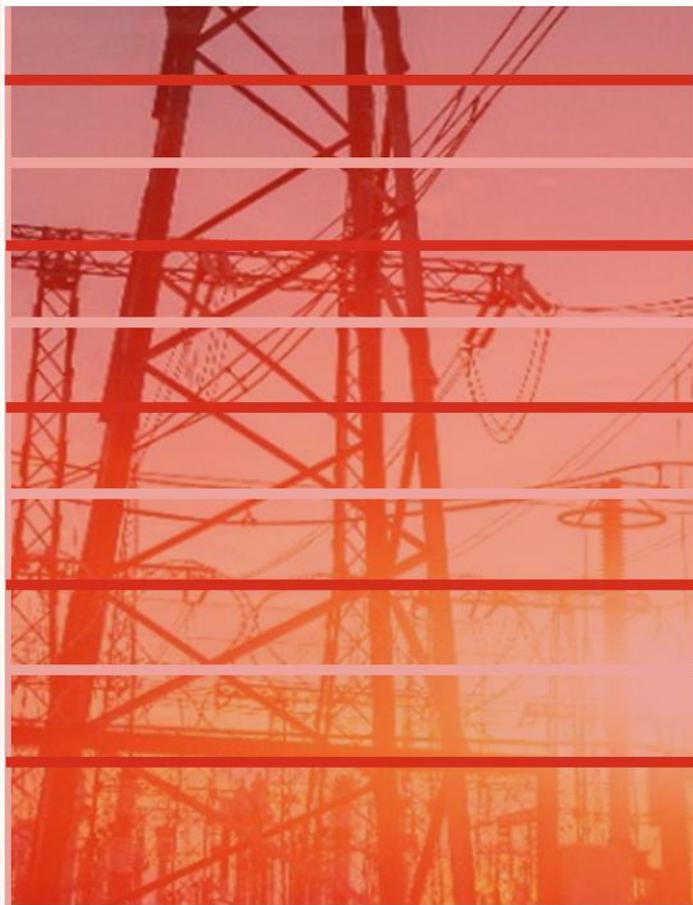
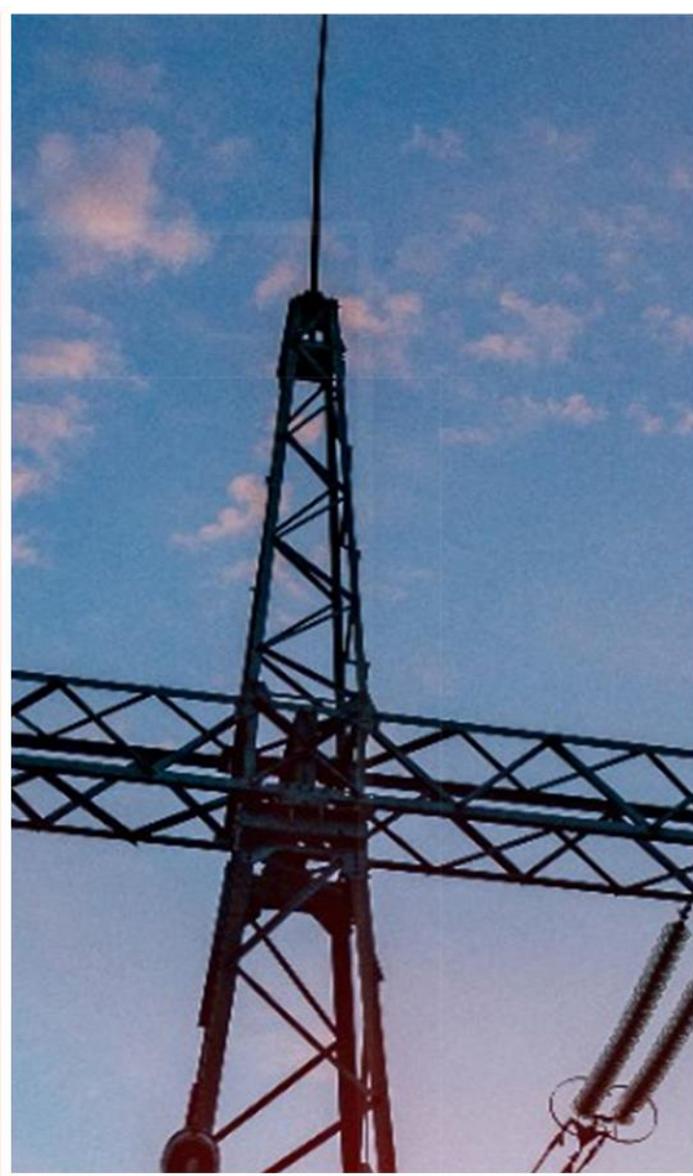


KV	Kilovolt
kW	kilowatt
Pf	Power Factor
NETAP	Nigeria Electricity Transmission Project
MW	Megawatts
MVA	Megavolt Ampere
GIS	Gas-insulated Substation
GW	Gigawatts
TREP	Transmission Rehabilitation and Expansion Program
SCADA	Supervisory Control and Data Acquisition
ERP	Enterprise Resource Programme
FGN	Federal Government of Nigeria
MRO	Minimum Remittance Order
AFD	Agence Française de Développement
AFDB	African Development Bank
DC	Double Circuit
HV	High Voltage
IDB	Islamic Development Bank
JICA	Japan International Cooperation Agency
SC	Single Circuit
WB	World Bank
PSMP	Power System Master Plan
NIPP	National Integrated Power Project



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# EXECUTIVE SUMMARY



# 1.1 Key Report Highlights

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## Introduction

This report represents the second volume of the Transmission Company of Nigeria's (TCN) Performance Improvement Plan (PIP) developed for the Nigerian Electricity Regulatory Commission (NERC). The PIP serves as a crucial requirement for filing a Major Tariff review in line with the provisions of the Multi-Year Tariff Order (MYTO) methodology and other relevant procedures governing electricity tariff review in the Nigerian Electricity Supply Industry.

The first volume of the PIP provided a comprehensive overview of TCN's background, funding sources, strategic goals, and the current state of its infrastructure. Building upon that foundation, this second volume delves into specific areas of improvement and strategies for enhancing TCN's performance.

This volume provides a detailed overview of the specific measures that TCN intends to implement in order to enhance its services and infrastructure. These measures are designed to address the immediate needs of the Discos (Distribution Companies), align with their priorities, and ensure the effective functioning of the power grid through a proactive maintenance strategy and grid control. To improve the services and infrastructure, TCN recognizes the importance of understanding the immediate needs of the Discos. By closely collaborating with the Discos, TCN aims to identify areas that require immediate attention and develop targeted solutions accordingly. These measures will be implemented in a timely manner to address any bottlenecks or shortcomings in the system.

TCN places a high priority on aligning its efforts with the priorities of the Discos. This collaborative approach ensures that the measures undertaken are in line with the goals and objectives set by the Discos. By working together, TCN and the Discos can effectively enhance the overall electricity transmission and distribution system, thus meeting the evolving demands of consumers and businesses.

A key component of TCN performance improvement is proactive maintenance strategy. TCN recognizes that regular maintenance is crucial for ensuring the reliability and efficiency of the power infrastructure. This includes conducting regular inspections, preventive maintenance, and equipment upgrades to minimize downtime, optimize performance, and prevent potential failures. By adopting this proactive approach, TCN aims to reduce service disruptions and enhance the overall stability of the power grid.

Moreover, grid control is a vital aspect of TCN's improvement measures. TCN understands the significance of maintaining a well-controlled and responsive grid to effectively manage power transmission and distribution. Through advanced technologies, real-time monitoring, and effective control mechanisms, TCN aims to optimize the utilization of grid resources, minimize transmission losses, and improve the overall reliability and stability of the power system.



The PIP will be a critical tool in driving organizational excellence and ensuring the efficient management of TCN's operations. It provides a roadmap for addressing challenges, optimizing resources, and meeting the evolving needs of the electricity sector. By adhering to the MYTO methodology and engaging in a comprehensive review process, TCN aims to enhance its performance, strengthen its financial stability, and deliver reliable and affordable electricity transmission services to consumers across Nigeria.

Through the implementation of the PIP, TCN will demonstrate its commitment to continuous improvement, transparency, and accountability. This collaborative effort with NERC underscores the importance of regulatory oversight and industry-wide cooperation in achieving a sustainable and robust electricity supply system for the benefit of all stakeholders.

### **Project Selection**

In this second volume of the Performance Improvement Plan (PIP), TCN focuses on the selection of projects, which were mostly determined through extensive discussions with the eleven Distribution Companies (Discos). TCN shared the project list from the first volume with the Discos, seeking their valuable feedback.

Following this, TCN, the Discos, and the Nigerian Electricity Regulatory Commission (NERC) convened a joint meeting to further assess the projects. During this meeting, NERC mandated that project selection should be based on a forecasted load analysis for the upcoming five years. In response, TCN developed a load forecast template and distributed it to the Discos for completion. The populated load forecast template served as a crucial tool in prioritizing project selections based on the Discos' load requirements.

In addition to the projects chosen by the Discos, TCN's System Planning Department independently selected projects at the 330kV level. These selections focused on addressing critical infrastructure needs, ensuring reliability, and enhancing system stability. This complementary approach between the Discos' project selection and TCN's System Planning Department allows for a comprehensive and well-rounded set of initiatives to be included in the PIP.

By incorporating the Discos' feedback, aligning with load forecasts, and considering critical system requirements, TCN aimed to ensure that the selected projects within the PIP effectively meet the evolving needs of the electricity supply industry. This collaborative approach demonstrates a commitment to optimal project prioritization, improved performance, and the provision of reliable electricity transmission services throughout Nigeria.

The joint efforts between TCN, the Discos, and NERC in project selection underscore the importance of coordination and consensus-building in advancing the goals of the Nigerian Electricity Supply Industry. Through this inclusive process, TCN and its stakeholders strive to enhance the efficiency, reliability, and sustainability of the nation's electricity transmission network.



### **Emphasis on collaborative Approach**

In line with the recommendation from the Nigerian Electricity Regulatory Commission (NERC), TCN has adopted a collaborative approach to meet the needs of the Distribution Companies (Discos). This approach recognizes the importance of incorporating the input and preferences of the Discos in determining project priorities, ensuring alignment with their specific requirements and operational needs.

By actively involving the Discos in the project prioritization process, TCN seeks to foster a collaborative and customer-centric approach to project management. The aim is to create a framework where the Discos have a voice in shaping the priorities based on their unique demands and justifications. This collaborative approach allows for effective coordination and ensures that the projects implemented by TCN are tailored to meet the specific needs of each Disco.

Through this collaborative engagement, TCN and the Discos can work together to develop a comprehensive project prioritization plan. By incorporating the Discos' input, TCN can align its projects with the demands and operational realities of each Disco's franchise area. This approach enhances the overall effectiveness and efficiency of project implementation, leading to the improvement of the electricity transmission infrastructure within the Discos' respective areas.

By adopting a collaborative approach, TCN aims to build stronger relationships with the Discos, foster a sense of ownership and involvement, and ultimately drive the successful execution of projects. This collaborative effort reflects TCN's commitment to meeting the specific needs of its stakeholders and promoting a customer-focused approach within the Nigerian Electricity Supply Industry.



### 2.1 Meeting with Abuja Disco

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#### **Purpose of Meeting**

On February 8, 2023, the TCN PIP Committee held a meeting with Abuja Distribution Company (AEDC) at the TCN Corporate Headquarters. The primary purpose of the consultation meeting was to foster engagement between TCN and AEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>1</sup> within the Abuja Distribution Company (AEDC) franchise area and told the AEDC team to review and prioritize these projects based on AEDC specific demands and priorities. TCN highlighted that the AEDC team's input is crucial in determining the priority and justification for each project.

TCN also informed AEDC that certain projects, such as those under the Abuja Ring Fence Scheme, Service Level Agreement (SLA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that AEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

#### **Project Selection Justification**

TCN suggested that AEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: AEDC should outline the specific objectives of each selected project. For example, AEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.

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<sup>1</sup> Please see volume 1 for the list of projects



2. Justification for the Project: AEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. AEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.

3. Timeline for the Project: AEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, AEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and AEDC, ensuring that the projects are aligned with AEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to AEDC**

AEDC expressed gratitude to TCN for the consultation meeting and emphasized the importance of aligning the priorities between TCN and AEDC. AEDC acknowledged that many of the projects presented by TCN will address the immediate needs of AEDC.

However, AEDC highlighted the urgent requirement for the completion of the Katampe-Kukwaba 132kV line. TCN acknowledged that the Katampe-Kukwaba 132kV line has faced challenges due to right-of-way issues in the Wuye area. However, TCN assured AEDC that efforts are being made to resolve these right-of-way issues promptly and ensure the line's completion. TCN recognizes the significance of completing the line to meet AEDC's requirements and enhance the overall electricity supply in the area.

Additionally, AEDC mentioned the need for additional bays at the Central Area substation to accommodate the growing demand and ensure reliable power supply. TCN informed that steps have already been taken to address the requirement of additional bays at Central Area substation. An additional 2X100MVA capacity has been procured to meet the increased demand and enhance the substation's capabilities.

AEDC also highlighted the necessity for an additional transformer in Kubwa to replace a faulty transformer, emphasizing the importance of maintaining a stable and robust distribution network.

The concerns expressed by AEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with AEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient project implementation, TCN and IBEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the IBEDC franchise area.



TCN emphasized the criticality of reconductoring the Katampe-Kubwa 132kV line, which has been identified as a key aspect in the TCN PIP. TCN requested AEDC to define its downstream requirements, enabling TCN to understand its upstream obligations and take appropriate actions to meet the demand effectively.

Regarding the Abuja ring project, TCN explained that it was designed to create redundancy and meet the increasing demand of the fast growing Federal Capital Territory (FCT). The Dawaki substation has already been completed, and other substations within the project are at various stages of completion. The Abuja ring project aims to enhance the reliability and stability of the electricity supply in the FCT.

These concerns and requests from AEDC highlight specific areas where immediate attention is needed to address infrastructure requirements and enhance service delivery. TCN will take these concerns into consideration and work collaboratively with AEDC to find practical solutions that meet the pressing needs of the distribution company.

Through this ongoing dialogue and collaboration, TCN and AEDC aim to ensure the timely completion of critical projects, such as the Katampe-Kukwaba 132kV line, and address the additional infrastructure requirements at the Central Area substation and Kubwa. By addressing these specific concerns, TCN and AEDC will jointly contribute to the improvement of electricity distribution services, customer satisfaction, and the overall reliability of the power supply within the AEDC franchise area.

### **Meeting Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and AEDC can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the AEDC franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.

TCN and AEDC will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the AEDC franchise area.

## **2.2 Abuja Disco's Load Forecast**

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### **Load Forecast**

AEDC submitted the load forecast given in [Table 2-1](#) for planning purposes.



Table 2-1: Abuja Disco Forecast for Year 2024 to 2028

#	TCN STATION	2024		2025		2026		2027		2028	
		Max (MW)	Ave (MW)	Max (MW)	Ave (MW)						
1	Ajaokuta 132kV	50.33	17.11	54.85	18.65	59.79	20.33	65.17	22.16	71.04	24.16
2	Okene 132kV	62.13	26.81	67.72	29.23	73.82	31.86	80.46	34.72	87.70	37.85
3	Lokoja 132kV	42.95	21.40	46.81	23.33	51.02	25.43	55.62	27.72	60.62	30.21
4	Akwanga 132kV	21.04	11.77	22.93	12.83	24.99	13.99	27.24	15.25	29.70	16.62
5	Apo 132kV	199.69	112.94	217.66	123.11	237.25	134.19	258.60	146.26	281.88	159.43
6	Lafia 132kV	37.39	15.15	40.75	16.51	44.42	18.00	48.42	19.62	52.77	21.39
7	Karu 132kV	119.14	74.77	129.86	81.50	141.55	88.84	154.29	96.83	168.17	105.55
8	Keffi 132kV	45.78	25.72	49.90	28.04	54.39	30.56	59.29	33.31	64.62	36.31
9	Gwagwalada 132kV	58.75	38.26	64.04	41.70	69.80	45.46	76.08	49.55	82.93	54.01
10	Kukwaba 132kV	95.81	51.23	104.43	55.84	113.83	60.87	124.08	66.34	135.25	72.32
11	Suleja 132kV	113.03	51.67	123.21	56.32	134.29	61.38	146.38	66.91	159.56	72.93
12	Central Area 132kV	132.33	90.47	144.24	98.61	157.22	107.49	171.37	117.16	186.79	127.71
13	Katampe2 132kV	93.63	53.41	102.06	58.22	111.24	63.46	121.25	69.17	132.17	75.39
14	Katampe3 132kV	80.55	36.27	87.80	39.53	95.70	43.09	104.32	46.97	113.70	51.19
15	Kubwa 132kV	109.76	66.38	119.64	72.36	130.41	78.87	142.15	85.97	154.94	93.70
16	Bida 132kV	65.32	22.21	71.20	24.21	77.61	26.39	84.60	28.77	92.21	31.36
17	Kontagora 132kV	25.07	9.19	27.33	10.02	29.79	10.92	32.47	11.90	35.39	12.98
18	Minna 132kV	97.73	35.33	106.53	38.51	116.11	41.97	126.56	45.75	137.95	49.87
19	Shiroro II TS 132kV	27.29	3.49	29.75	3.80	32.43	4.14	35.35	4.52	38.53	4.92
20	Tegina 132kV	18.09	9.05	19.72	9.86	21.50	10.75	23.43	11.72	25.54	12.77
	<b>TOTAL</b>	<b>1495.81</b>	<b>772.64</b>	<b>1630.43</b>	<b>842.18</b>	<b>1777.17</b>	<b>917.98</b>	<b>1937.11</b>	<b>1000.60</b>	<b>2111.45</b>	<b>1090.65</b>

**Analysis of recent Disco's Consumption**

Table 2-2 gives the monthly energy consumption and deficit amounts of Abuja Disco from July 2022 to June 2023. Table 2-3 gives the monthly average of the figures in Table 2-2 in MWh/h. During the period of July 2022 to June 2023, Abuja Disco was projected to receive an average of 587.67 MWh/h of electricity from the grid. However, it only received 484.34 MWh/h, which accounts for approximately 82.42% of the required energy. There was an average generation shortage of 78.85 MWh/h. TCN outages were responsible for 8.76 MWh/h and those of Abuja Disco was responsible for 15.72 MWh/h. This information is depicted in graphical form in Figure 2-1.

Table 2-2: Monthly Energy Profile of Abuja Disco: July 2022 to June 2023

Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)
Jul-22	313,960,840.00	14,993,369.37	4,478,470.56	103,791,320.07	437,224,000
Aug-22	331,368,450.00	23,518,928.75	2,934,352.05	79,402,269.20	437,224,000
Sep-22	338,114,650.00	17,514,634.28	6,114,792.61	61,375,923.12	423,120,000
Oct-22	363,953,210.00	6,546,538.25	7,172,237.14	59,552,014.61	437,224,000
Nov-22	372,869,980.00	397,935.00	7,434,420.00	42,417,665.00	423,120,000
Dec-22	374,193,930.00	2,152,518.57	12,262,155.79	48,615,395.64	437,224,000
Jan-23	346,564,920.00	1,219,530.00	6,736,450.00	82,703,100.00	437,224,000
Feb-23	342,195,310.00	815,031.43	10,231,612.19	41,670,046.38	394,912,000
Mar-23	399,565,390.00	5,638,667.71	6,634,406.25	25,385,536.04	437,224,000
Apr-23	362,648,260.00	2,350,180.00	126,480.00	57,995,080.00	423,120,000
May-23	354,613,510.00	20,612,630.00	3,327,290.00	58,670,570.00	437,224,000
Jun-23	342,806,840.00	41,916,940.00	9,255,250.00	29,140,970.00	423,120,000
<b>TOTAL</b>	<b>4,242,855,290</b>	<b>137,676,903</b>	<b>76,707,917</b>	<b>690,719,890</b>	<b>5,147,960,000</b>



Table 2-3: Average Monthly Energy Profile of Abuja Disco: July 2022 to June 2023

	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	421.99	20.15	6.02	139.50	587.67
Aug-22	445.39	31.61	3.94	106.72	587.67
Sep-22	469.60	24.33	8.49	85.24	587.67
Oct-22	489.18	8.80	9.64	80.04	587.67
Nov-22	517.87	0.55	10.33	58.91	587.67
Dec-22	502.95	2.89	16.48	65.34	587.67
	465.81	1.64	9.05	111.16	587.67
Feb-23	509.22	1.21	15.23	62.01	587.67
Mar-23	537.05	7.58	8.92	34.12	587.67
Apr-23	503.68	3.26	0.18	80.55	587.67
May-23	476.63	27.71	4.47	78.86	587.67
Jun-23	476.12	58.22	12.85	40.47	587.67
TOTAL	484.34	15.72	8.76	78.85	587.67

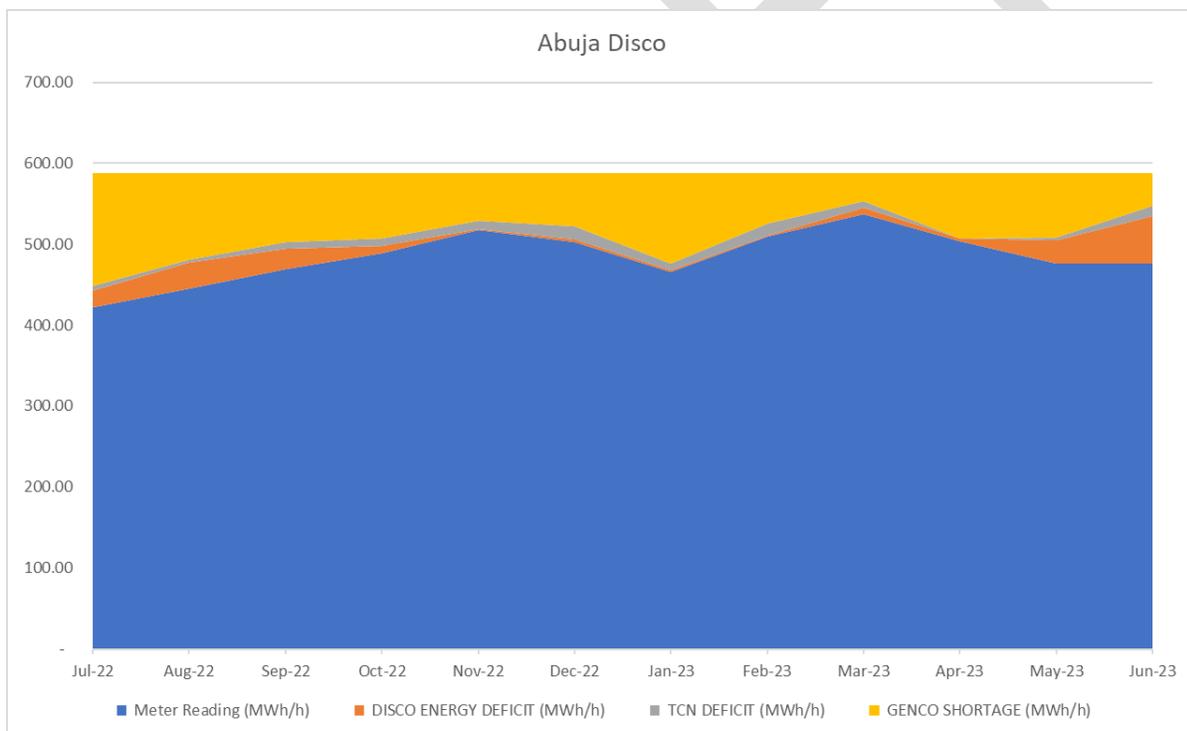


Figure 2-1: Energy Consumption and Deficits for Abuja Disco July 2023 to June 2023.

During the specified period, Abuja Disco experienced a generation shortage, resulting in 13.42% (78.85 MWh/h) of its required energy not being met. It is crucial for Abuja Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Abuja Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Abuja



Disco to ensure adequate procurement of generation capacity to optimize the desired expanded transmission capacity.

### Outage Issues

The average level of feeder outages caused by Abuja Disco and TCN are given in Table 2-4. The TCN outage levels in Karu, Kukwaba and Apo are relatively high.

Table 2-4: Abuja Disco's Outage Breakdown by Entity: January 2023 to June 2023

TCN STATION	ACTUAL (MWh)	FORECAST (MWh)	DISCO -VE (MWh)	DISCO +VE (MWh)	TCN -VE (MWh)
Karu 132kV	36.69	46.79	(9.90)	11.06	(1.16)
Kukwaba 132kV	38.82	41.99	(6.79)	10.35	(1.03)
Apo 132kV	96.66	108.96	(19.97)	16.95	(0.94)
Central Area 132kV	49.08	56.94	(14.59)	8.28	(0.77)
Kubwa 132kV	33.99	27.58	(4.77)	17.21	(0.72)
Suleja 132kV	33.97	58.79	(17.79)	5.11	(0.69)
Katampe3 132kV	27.69	31.83	(9.30)	6.43	(0.48)
Keffi 132kV	12.80	20.78	(9.14)	3.67	(0.42)
Gwagwalada 132kV	17.64	24.94	(10.04)	3.59	(0.39)
Lafia 132kV	12.68	14.76	(3.71)	2.12	(0.36)
Akwanga 132kV	4.18	4.83	(1.21)	1.13	(0.27)
Okene 132kV	11.01	25.31	(12.98)	2.61	(0.24)
Bida 132kV	15.07	20.28	(9.69)	5.45	(0.21)
Minna 132kV	31.56	28.75	(9.99)	14.18	(0.19)
Katampe2 132kV	32.67	34.13	(9.83)	9.46	(0.16)
Ajaokuta 132kV	8.75	12.25	(5.60)	2.25	(0.12)
Kontagora 132kV	7.34	5.05	(0.79)	3.24	(0.06)
Lokoja 132kV	18.02	13.75	(2.44)	6.81	(0.03)
Tegina 132kV	0.00	2.86	(2.78)	-	(0.03)
Shiroro II TS 132kV	2.53	3.91	(2.36)	1.02	(0.02)
Dawaki 132kV	7.68	5.86	(0.95)	2.78	(0.00)
<b>Total</b>	<b>498.83</b>	<b>590.34</b>	<b>(164.62)</b>	<b>133.70</b>	<b>(8.29)</b>



## 3 BENIN DISCO

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### 3.1 Meeting with Benin Disco

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#### **Purpose of Meeting**

On January 30, 2023, the TCN PIP Committee held a meeting with Benin Distribution Company (BEDC) at the PWC Experience Centre. The primary purpose of the consultation meeting was to foster engagement between TCN and BEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>2</sup> within the Benin Distribution Company (BEDC) franchise area and told the BEDC team to review and prioritize these projects based on BEDC specific demands and priorities. TCN highlighted that the BEDC team's input is crucial in determining the priority and justification for each project.

TCN also informed BEDC that certain projects, such as those under the Service Level Agreement (SLA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that BEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

#### **Project Selection Justification**

TCN suggested that BEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: BEDC should outline the specific objectives of each selected project. For example, BEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.

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<sup>2</sup> Please see volume 1 for the list of projects



2. Justification for the Project: BEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. BEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.

3. Timeline for the Project: BEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, BEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and BEDC, ensuring that the projects are aligned with BEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to BEDC**

BEDC expressed gratitude to TCN for the consultation meeting and acknowledged that many of the projects presented address the challenges faced by BEDC. BEDC has recognized the importance of the projects and has made plans to utilize the additional capacity that will be added once these projects are completed.

However, BEDC also raised concerns regarding the slow pace of work for most of the projects listed. This slow progress poses a challenge for BEDC in making investment decisions and planning for the future. The delayed implementation of these projects hampers BEDC's ability to effectively optimize resources, meet customer demands, and plan for the expansion of its services.

The concerns expressed by BEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with BEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient project implementation, TCN and BEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the BEDC franchise area.

In response to the concerns raised by BEDC, TCN acknowledged that issues beyond the control of TCN has hindered the completion of some projects. For instance Right of Way issues have slowed down the progress of work on the Ihovbor-New Akure line, despite the completion of the New Akure substation. TCN suggested that BEDC and TCN collaborate to appeal to the relevant stakeholders, particularly the Edo state government, in order to resolve the Right of Way issues for the Ihovbor-New Akure 330kV line. This collaborative effort can help overcome the obstacles and expedite the completion of the project.



Regarding the SLA projects, TCN clarified that the procurement for these projects is the responsibility of the Distribution Companies (DISCOs). As a result, the pace of work for the SLA projects largely depends on the timely procurement efforts of the DISCOs. On the other hand, TCN informed BEDC that all the necessary equipment for the WB/NETAP projects has been procured and is currently being transported to the respective project sites. Therefore, TCN expects the WB/NETAP projects to be completed within the current year (2023)

Through joint efforts and active engagement of relevant stakeholders, challenges can be addressed, and projects can be expedited, resulting in improved electricity supply services and enhanced customer satisfaction within the BEDC franchise area.

### **Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and BEDC can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the BEDC franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.

TCN and BEDC will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the BEDC franchise area.

## **3.2 Benin Disco's Load Forecast**

### **Load Forecast**

BEDC submitted the load forecast given in [Table 3-1](#) for planning purposes.

**Table 3-1: Benin Disco Forecast for Year 2024 to 2028**

TCN STATION	2024		2025		2026		2027		2028	
	Max (MW)	Ave (MW)								
Okpella	25.3	3.5	26.6	3.7	28.0	3.9	29.5	4.1	31.0	4.3
Benin	143.5	99.0	188.6	130.0	200.1	137.9	211.7	145.9	224.1	154.5
Etsako	28.7	11.2	30.2	11.7	31.8	12.4	33.5	13.0	35.3	13.7
Irrua	26.3	7.2	32.8	9.0	34.7	9.5	36.7	10.1	38.8	10.6
Oghara	14.7	3.5	15.5	3.6	16.3	3.8	17.2	4.0	18.1	4.2
Ihovbor	62.1	38.7	65.4	40.7	68.8	42.9	72.4	45.1	76.2	47.5
Okada	14.8	3.0	15.6	3.1	16.4	3.3	17.3	3.5	18.2	3.7
Delta	72.6	26.5	138.4	50.6	147.4	53.9	157.0	57.4	167.2	61.1



Ondo	18.3	7.7	29.4	12.4	31.2	13.2	33.2	14.0	35.3	14.9
Amukpe	48.5	16.3	94.8	31.8	101.0	33.9	107.6	36.1	114.7	38.5
Effurun	63.2	27.8	94.2	41.5	100.2	44.1	106.3	46.8	112.8	49.7
Agbor	68.4	27.6	101.8	41.1	107.9	43.5	114.5	46.2	121.5	49.0
Asaba	74.8	44.1	139.7	82.4	148.7	87.7	158.4	93.4	168.6	99.5
Ado Ekiti	89.7	35.2	160.7	63.0	170.9	67.0	181.9	71.3	193.6	75.9
Akure	48.5	23.9	95.4	47.1	101.6	50.2	108.2	53.4	115.4	57.0
Omotosho	45.6	24.2	48.0	25.4	50.6	26.8	53.2	28.2	56.0	29.7
<b>Total</b>	<b>845</b>	<b>399</b>	<b>1,277</b>	<b>597</b>	<b>1,356</b>	<b>634</b>	<b>1,439</b>	<b>673</b>	<b>1,527</b>	<b>714</b>

### Analysis of recent Discos Consumption

Table 3-2 gives the monthly energy consumption and deficit amounts of Benin Disco from July 2022 to June 2023. Table 3-3 gives the monthly average of the figures in Table 3-2 in MWh/h. During the period of July 2022 to June 2023, Benin Disco was projected to receive an average of 363.00 MWh/h of electricity from the grid. However, it only received 301.72 MWh/h, which accounts for approximately 83.12% of the required energy. There was an average generation shortage of 55.63 MWh/h. TCN outages were responsible for 1.21 MWh/h and those of Benin Disco was responsible for 4.44 MWh/h. This information is depicted in graphical form in Figure 3-1

Table 3-2: Monthly Energy Profile of Benin Disco: July 2022 to June 2023

Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)
Jul-22	208,113,460	3,131,890	389,872	58,436,778	270,072,000
Aug-22	236,056,650	-	-	34,015,350	270,072,000
Sep-22	237,887,040	-	-	23,472,960	261,360,000
Oct-22	228,614,830	-	-	41,457,170	270,072,000
Nov-22	241,222,800	-	-	20,137,200	261,360,000
Dec-22	219,186,200	4,682,649	5,882,479	40,320,672	270,072,000
Jan-23	209,693,340	-	-	60,378,660	270,072,000
Feb-23	204,039,810	1,294,307	687,529	37,914,353	243,936,000
Mar-23	216,764,262	14,495,921	2,076,222	36,735,595	270,072,000
Apr-23	212,419,240	-	-	48,940,861	261,360,101
May-23	219,977,180	10,835,410	645,690	38,613,720	270,072,000
Jun-23	209,089,880	4,496,240	884,450	46,889,430	261,360,000
<b>TOTAL</b>	<b>2,643,064,692</b>	<b>38,936,417</b>	<b>10,566,243</b>	<b>487,312,749</b>	<b>3,179,880,101</b>

Table 3-3: Average Monthly Energy Profile of Benin Disco: July 2022 to June 2023

Month	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	208,113,460	3,131,890	389,872	58,436,778	270,072,000
Aug-22	236,056,650	-	-	34,015,350	270,072,000
Sep-22	237,887,040	-	-	23,472,960	261,360,000
Oct-22	228,614,830	-	-	41,457,170	270,072,000
Nov-22	241,222,800	-	-	20,137,200	261,360,000
Dec-22	219,186,200	4,682,649	5,882,479	40,320,672	270,072,000
Jan-23	209,693,340	-	-	60,378,660	270,072,000
Feb-23	204,039,810	1,294,307	687,529	37,914,353	243,936,000
Mar-23	216,764,262	14,495,921	2,076,222	36,735,595	270,072,000
Apr-23	212,419,240	-	-	48,940,861	261,360,101
May-23	219,977,180	10,835,410	645,690	38,613,720	270,072,000
Jun-23	209,089,880	4,496,240	884,450	46,889,430	261,360,000
<b>TOTAL</b>	<b>2,643,064,692</b>	<b>38,936,417</b>	<b>10,566,243</b>	<b>487,312,749</b>	<b>3,179,880,101</b>



Jul-22	279.72	4.21	0.52	78.54	363.00
Aug-22	317.28	-	-	45.72	363.00
Sep-22	330.40	-	-	32.60	363.00
Oct-22	307.28	-	-	55.72	363.00
Nov-22	335.03	-	-	27.97	363.00
Dec-22	294.61	6.29	7.91	54.19	363.00
Jan-23	281.85	-	-	81.15	363.00
Feb-23	303.63	1.93	1.02	56.42	363.00
Mar-23	291.35	19.48	2.79	49.38	363.00
Apr-23	295.03	-	-	67.97	363.00
May-23	295.67	14.56	0.87	51.90	363.00
Jun-23	290.40	6.24	1.23	65.12	363.00
TOTAL	301.72	4.44	1.21	55.63	363.00

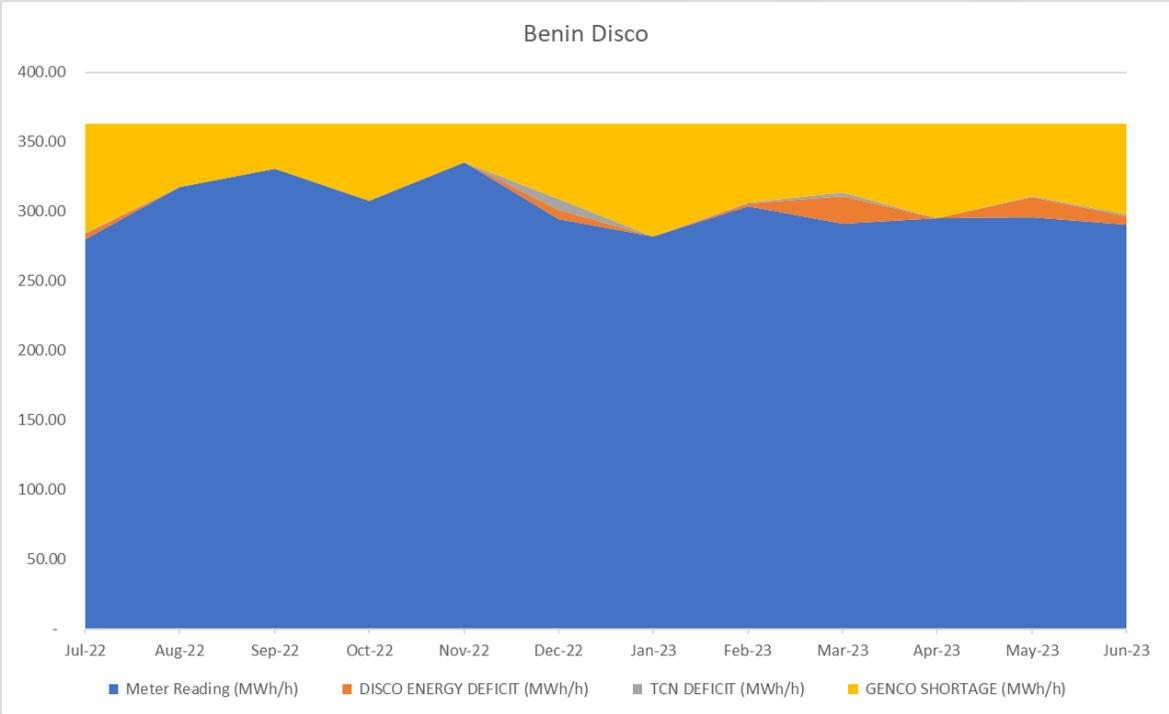


Figure 3-1: Energy Consumption and Deficits for Benin Disco July 2023 to June 2023.

During the specified period, Benin Disco experienced a generation shortage, resulting in 15.32% (55.63 MWh/h) of its required energy not being met. It is crucial for Benin Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Benin Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Benin



Disco to ensure adequate procurement of generation capacity to optimize the desired expanded transmission capacity.

### Outage Issues

The average level of feeder outages caused by Benin Disco and TCN are given in [Table 3-4](#).

[Table 3-4: Benin Disco's Outage Breakdown by Entity: January 2023 to June 2023](#)

TCN STATION	ACTUAL (MWh/h)	FORECAST (MWh/h)	DISCO -VE (MWh/h)	DISCO +VE (MWh/h)	TCN -VE (MWh/h)
Effurun 132kV	34.19	37.44	(11.29)	9.76	(0.75)
Amukpe 132kV	14.28	24.09	(11.51)	2.42	(0.61)
Delta 132kV	21.37	39.21	(20.96)	5.21	(0.50)
Benin 132kV	66.60	84.34	(33.89)	16.64	(0.40)
Akure 132kV	19.02	26.41	(10.01)	4.00	(0.32)
Ado Ekiti 132kV	12.55	15.62	(5.62)	3.43	(0.20)
Okpella 132kV	4.40	11.90	(7.51)	0.21	(0.20)
Ihovbor 132kV	32.78	28.80	(7.10)	11.39	(0.13)
Ondo 132kV	8.15	12.02	(4.46)	1.19	(0.11)
Asaba 132kV	40.85	38.08	(10.21)	13.63	(0.09)
Irrua 132kV	7.06	13.90	(8.22)	1.70	(0.07)
Oghara 132kV	2.80	5.40	(2.78)	0.22	(0.03)
Etsako 132kV	9.45	12.04	(4.24)	1.99	(0.02)
Agbor 132kV	7.54	7.41	(1.19)	1.33	(0.01)
Okada 132kV	2.81	6.14	(3.59)	0.27	(0.01)
Omotosho 132kV	2.42	0.57	(0.21)	2.07	(0.01)
<b>Total</b>	<b>286.28</b>	<b>363.37</b>	<b>(142.80)</b>	<b>75.45</b>	<b>(3.45)</b>



### 4.1 Meeting with Eko Disco

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#### **Purpose of Meeting**

On January 31st, 2023, the TCN PIP Committee held a meeting with Eko Distribution Company (EKEDC) at the PWC Experience Centre. The primary purpose of the consultation meeting was to foster engagement between TCN and EKEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>3</sup> within the Eko Distribution Company (EKEDC) franchise area and told the EKEDC team to review and prioritize these projects based on EKEDC specific demands and priorities. TCN highlighted that the EKEDC team's input is crucial in determining the priority and justification for each project.

TCN also informed EKEDC that certain projects, such as those under the Service Level Agreement (SLA), Japan International Cooperation Agency (JICA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that EKEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

#### **Project Selection Justification**

TCN suggested that EKEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: EKEDC should outline the specific objectives of each selected project. For example, EKEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.

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<sup>3</sup> Please see volume 1 for the list of projects



2. Justification for the Project: EKEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. EKEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.

3. Timeline for the Project: EKEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, EKEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and EKEDC, ensuring that the projects are aligned with EKEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to EKEDC**

EKEDC expressed its appreciation to TCN for the consultation meeting. The company stated that most of the challenges it faces are currently being addressed by the projects listed, and that EKEDC has signed the SLA and some of the SLA contracts have been awarded.

EKEDC also observed that the New Agbara project, which is captured under the EKEDC franchise area, is actually in the IBEDC franchise area. However, EKEDC will share feeders in the substation.

EKEDC is committed to working with TCN to improve the power supply in its franchise area. The company is confident that the projects listed will help to address the challenges it faces and improve the quality of service to its customers.

The reconductoring projects in the EKEDC franchise area were also discussed. Some of these projects have been completed, while others are ongoing. There are also some projects that have yet to begin.

The concerns expressed by EKEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with EKEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient project implementation, TCN and EKEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the EKEDC franchise area.

TCN provided an update regarding the SLA projects, stating that a few of them have been completed using TCN's internally generated revenue (IGR) due to their urgency. Considering this, TCN Lagos region, in agreement with EKEDC and the SLA contractors, has decided to conduct a re-evaluation of the projects before commencing any further work. If it is determined that TCN has already completed a particular project, the allocated resources will be



reallocated to another project within the EKEDC franchise area. These adjustments to the SLA projects will be appropriately documented and communicated to the Nigerian Electricity Regulatory Commission (NERC) for transparency and compliance purposes.

Furthermore, it was observed that some projects included in the SLA are also part of the National Electricity Transmission Asset Plan (NETAP). Given that the NETAP projects are likely to be completed before the SLA projects, a re-evaluation of the SLA projects for EKEDC is deemed necessary. TCN will undertake this re-evaluation process and promptly communicate the outcomes to NERC. Finally, the validation of the reconductoring projects will be done by TCN's System Planning and Development (SP&D) department. The DISCOs (Distribution Companies) should show evidence of load downstream to justify the reconductoring of lines.

### **Meeting Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and EKEDC can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the EKEDC franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.

TCN and EKEDC will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the EKEDC franchise area.



## 4.2 Eko Discos Load Forecast

### Load Forecast

Eko Disco submitted the load forecast given in [Table 4-1](#) for planning purposes.

[Table 4-1: Eko Disco Forecast for Year 2024 to 2028](#)

TCN STATION	2024		2025		2026		2027		2028	
	Max (MW)	Ave (MW)								
Aja 132kV	114.72	69.16	118.64	71.52	123.38	74.39	128.62	77.54	134.42	81.04
Akoka 132kV	22.82	14.17	23.60	14.65	24.55	15.24	25.59	15.88	26.74	16.60
Alagbon 132kV	141.04	88.14	145.87	91.15	151.70	94.80	158.13	98.82	165.26	103.28
Amuwo-Odofin 132kV	41.49	27.21	42.91	28.14	44.63	29.26	46.52	30.51	48.62	31.88
Apapa-Road 132kV	31.22	15.96	32.29	16.51	33.58	17.17	35.01	17.90	36.58	18.70
Lekki 132kV	71.88	53.79	74.34	55.63	77.32	57.86	80.60	60.31	84.23	63.03
Akangba 132kV	94.39	50.19	97.62	51.91	101.53	53.98	105.83	56.27	110.61	58.81
Ijora 132kV	49.18	29.46	50.86	30.47	52.89	31.68	55.14	33.03	57.62	34.52
Ilashe-Island 132kV										
Isolo 132kV	23.55	14.65	24.35	15.15	25.33	15.75	26.40	16.42	27.59	17.16
Itire 132kV	8.30	5.64	8.58	5.84	8.93	6.07	9.30	6.33	9.72	6.61
Ojo 132kV	43.57	28.13	45.06	29.09	46.86	30.26	48.85	31.54	51.05	32.96
Agbara 132kV	45.64	30.89	47.20	31.95	49.09	33.23	51.17	34.64	53.48	36.20
	<b>687.80</b>	<b>427.39</b>	<b>711.33</b>	<b>442.01</b>	<b>739.78</b>	<b>459.69</b>	<b>771.14</b>	<b>479.18</b>	<b>805.92</b>	<b>500.79</b>

### Analysis of recent Discos Consumption

[Table 4-2](#) gives the monthly energy consumption and deficit amounts of Eko Disco from July 2022 to June 2023. [Table 4-3](#) gives the monthly average of the figures in [Table 4-2](#) in MWh/h. During the period of July 2022 to June 2023, Eko Disco was projected to receive an average of 513.13 MWh/h of electricity from the grid. However, it only received 399.54 MWh/h, which accounts for approximately 77.83% of the required energy. There was an average generation shortage of 92.25 MWh/h. TCN outages were responsible for 2.46 MWh/h and those of Ikeja Disco was responsible for 19.08MWh/h. This information is depicted in graphical form in [Figure 4-1](#).



Table 4-2: Monthly Energy Profile of Eko Disco: July 2022 to June 2023

Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)
Jul-22	225,832,910	9,342,554	1,426,595	145,317,941	381,920,000
Aug-22	273,463,020	28,776,801	3,655,758	76,024,420	381,920,000
Sep-22	262,968,010	22,177,626	2,365,465	82,088,899	369,600,000
Oct-22	269,802,920	4,668,532	2,205,633	105,242,914	381,920,000
Nov-22	306,400,160	4,932,966	748,265	57,518,610	369,600,000
Dec-22	337,638,810	738,597	504,974	43,037,619	381,920,000
Jan-23	294,804,640	2,431,644	1,038,111	83,645,605	381,920,000
Feb-23	299,032,810	4,801,539	1,040,811	40,084,840	344,960,000
Mar-23	333,485,540	13,084,652	2,218,658	33,131,149	381,920,000
Apr-23	287,705,950	10,796,570	2,341,630	68,755,850	369,600,000
May-23	313,056,200	18,499,180	1,543,890	48,820,730	381,920,000
Jun-23	295,767,170	46,908,470	2,496,160	24,428,200	369,600,000
<b>TOTAL</b>	<b>3,499,958,140</b>	<b>167,159,132</b>	<b>21,585,951</b>	<b>808,096,777</b>	<b>4,496,800,000</b>

Table 4-3: Average Monthly Energy Profile of Eko Disco: July 2022 to June 2023

Month	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	303.54	12.56	1.92	195.32	513.33
Aug-22	367.56	38.68	4.91	102.18	513.33
Sep-22	365.23	30.80	3.29	114.01	513.33
Oct-22	362.64	6.27	2.96	141.46	513.33
Nov-22	425.56	6.85	1.04	79.89	513.33
Dec-22	453.82	0.99	0.68	57.85	513.33
Jan-23	396.24	3.27	1.40	112.43	513.33
Feb-23	444.99	7.15	1.55	59.65	513.33
Mar-23	448.23	17.59	2.98	44.53	513.33
Apr-23	399.59	15.00	3.25	95.49	513.33
May-23	420.77	24.86	2.08	65.62	513.33
Jun-23	410.79	65.15	3.47	33.93	513.33
<b>TOTAL</b>	<b>399.54</b>	<b>19.08</b>	<b>2.46</b>	<b>92.25</b>	<b>513.33</b>



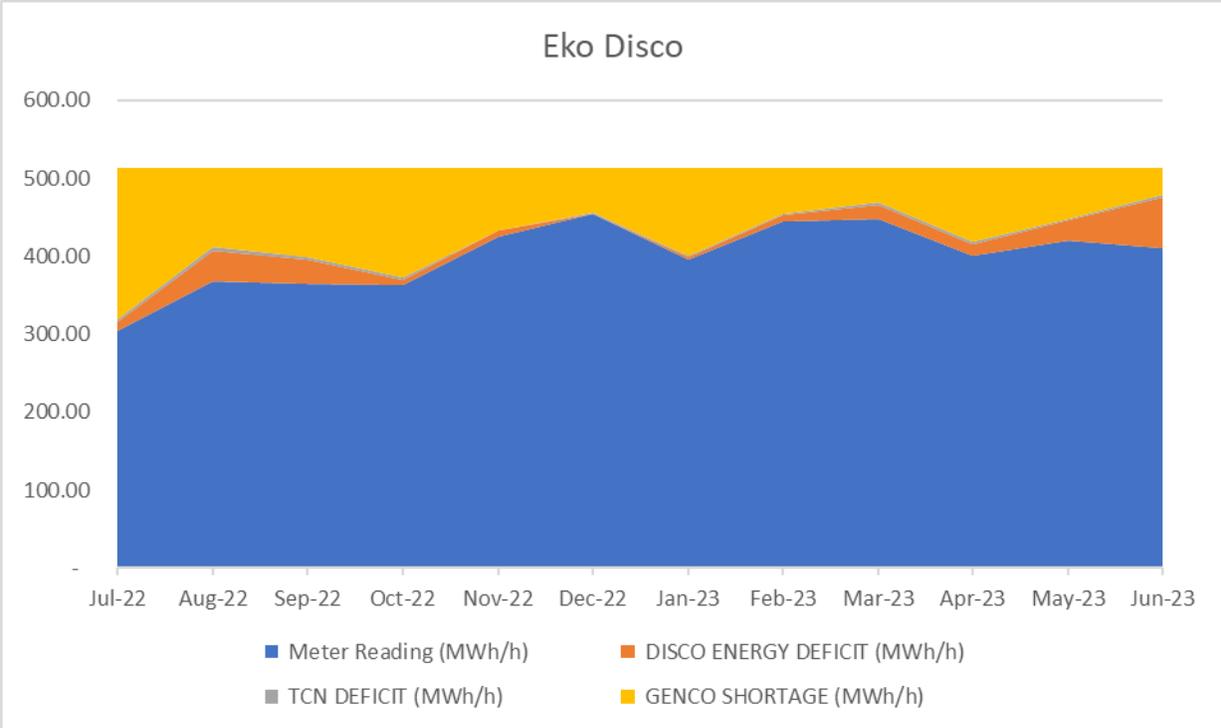


Figure 4-1: Energy and Deficits for Eko Disco July 2023 to June 2023.

During the specified period, Eko Disco experienced a generation shortage, resulting in 17.97% (92.25 MWh/h) of its required energy not being met. It is crucial for Eko Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Eko Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Ikeja Disco to ensure adequate procurement of generation capacity to optimize the desired expanded transmission capacity.

**Outage Issues**

The average level of feeder outages caused by Eko Disco and TCN are given in Table 4-4. The outages caused by TCN are minimal in Eko Disco’s franchise area.



Table 4-4: Eko Disco's Outage Breakdown by Entity: January 2023 to June 2023

TCN STATION	ACTUAL (MWh/h)	FORECAST (MWh/h)	DISCO -VE (MWh/h)	DISCO +VE (MWh/h)	TCN -VE (MWh/h)
Amuwo-Odofin 132kV	26.53	29.94	(6.25)	5.37	(0.78)
Aja 132kV	66.61	90.77	(24.97)	10.53	(0.68)
Akangba 132kV	50.70	51.43	(11.21)	11.44	(0.53)
Agbara 132kV	27.19	41.28	(14.37)	4.91	(0.46)
Ijora 132kV	27.59	28.72	(9.29)	8.70	(0.37)
Ojo 132kV	27.43	30.50	(8.10)	6.83	(0.32)
Alagbon 132kV	88.45	94.34	(34.14)	29.16	(0.32)
Lekki 132kV	56.55	63.89	(15.92)	11.43	(0.29)
Apapa-Road 132kV	15.54	14.50	(2.47)	3.92	(0.18)
Isolo 132kV	8.49	8.67	(1.65)	1.68	(0.18)
Itire 132kV	6.69	6.43	(0.94)	1.38	(0.13)
Akoka 132kV	14.92	14.02	(2.66)	3.66	(0.04)
Ilashe-Island 132kV	-	-	-	-	-
<b>Total</b>	<b>416.69</b>	<b>474.49</b>	<b>(131.96)</b>	<b>99.02</b>	<b>(4.29)</b>



## 5 ENUGU DISCO

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### 5.1 Meeting with Enugu Disco

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#### **Purpose of Meeting**

On February 1, 2023, the TCN PIP Committee held a meeting with Enugu Distribution Company (EEDC) at the PWC Experience Centre. The primary purpose of the consultation meeting was to foster engagement between TCN and EEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>4</sup> within the Enugu Distribution Company (EEDC) franchise area and told the EEDC team to review and prioritize these projects based on EEDC specific demands and priorities. TCN highlighted that the EEDC team's input is crucial in determining the priority and justification for each project.

TCN also informed EEDC that certain projects, such as those under the Service Level Agreement (SLA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that EEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

#### **Project Selection Justification**

TCN suggested that EEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: EEDC should outline the specific objectives of each selected project. For example, EEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.

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<sup>4</sup> Please see volume 1 for the list of projects



2. Justification for the Project: EEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. EEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.

3. Timeline for the Project: EEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, EEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and EEDC, ensuring that the projects are aligned with EEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to EEDC**

EEDC expressed its appreciation to TCN for the consultation meeting and acknowledged that one of the major challenges they face is the lengthy 33kV feeders caused by the positioning of TCN facilities. However, they reassured that these challenges are being actively addressed through the listed projects. Notably, the additional 100MVA capacity at the Awada substation is almost 90% complete, and EEDC is fully prepared to commence evacuation once the project reaches completion.

In addition, EEDC highlighted the planned Nnewi 132kV substation, which aims to provide power supply to the Nnewi industrial hub. However, the progress of the project has been hindered by right-of-way issues. As an alternative approach, EEDC intends to leverage the ongoing NDPHC Ihiala 330/132kV substation, which will serve as a route to transmit power to the Nnewi substation. This particular project has been designated as a priority by EEDC, as they plan to distribute power through four feeders radiating from the substation to cater to the industrial hub's energy requirements.

The concerns expressed by EEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with EEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient project implementation, TCN and EEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the EEDC franchise area.

In response, TCN acknowledged that there is an ongoing upgrade of the Alaoji Onitsha 330kV line, which involves the conversion to Quad conductor and includes turning in and out at Ihiala. They expressed optimism that once the line upgrade is completed, the Ihiala substation will be operational and commence its intended functions.



TCN expressed its optimism that the ongoing consultations and alignment efforts will yield positive results for the industry. TCN emphasized that the Nigerian Electricity Regulatory Commission (NERC) is dedicated to resolving the financing challenges by ensuring that the industry bears the cost of its projects, which will be integrated into the tariff structure. TCN appreciated the collaboration from all participants and urged them to continue working together to achieve full alignment of projects between TCN and EEDC.

#### **Meeting Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and EEDC can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the EEDC franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.

TCN and EEDC will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the EEDC franchise area.



## 5.2 Enugu Disco's Load Forecast

### Load Forecast

EEDC submitted the load forecast given in [Table 3-1](#) for planning purposes.

Table 5-1: Enugu Disco Forecast for Year 2024 to 2028

#	TCN STATION	2024		2025		2026		2027		2028	
		Max (MW)	Ave (MW)								
1	Agu Awka 132kV	53.6	43.4	58.8	47.6	64.7	52.4	71.3	57.8	78.8	63.8
2	GCM 132kV	52.2	41.8	53.2	42.6	54.3	43.4	55.5	44.4	56.7	45.4
3	Nibo Awka 132kV	70.6	55.8	74.8	59.1	79.4	62.7	84.3	66.6	89.7	70.9
4	Oji River 132kV	28.6	21.5	29.3	22.0	30.1	22.6	30.9	23.2	31.8	23.9
5	Onitsha 132kV	234.9	173.8	246.5	182.4	259.3	191.6	273.5	202.4	289.1	213.9
6	Abakaliki 132kV	73.6	59.6	74.4	60.3	75.3	61.0	74.3	60.2	77.5	62.8
7	New-Haven 132kV	178	144.2	181.8	147.3	186	150.7	190.4	154.2	195.1	158.0
8	Nkalagu 132kV	14.2	9.5	13.8	9.2	13.4	9.0	13.1	8.8	12.7	8.5
9	Ugwuaji 132kV	29.1	22.4	29.1	22.4	29.1	22.4	29	22.3	29	22.3
10	UNN Nsukka 132kV	39.4	31.5	41	32.8	42.7	34.2	44.4	35.5	46.3	37.0
11	Umuahia 132kV	92.6	70.4	96.2	73.1	100.2	76.2	104.6	79.5	109	82.8
12	Itu 132kV	9.4	8.4	9.3	8.3	9.1	8.1	9	8.0	8.9	7.9
13	Owerri 132kV	250.9	175.6	269.6	188.7	290.9	203.6	315	220.5	342.5	239.8
	<b>Total</b>	<b>1127.1</b>	<b>857.9</b>	<b>1177.8</b>	<b>895.8</b>	<b>1234.5</b>	<b>937.9</b>	<b>1295.3</b>	<b>983.4</b>	<b>1367.1</b>	<b>1037.0</b>

### Analysis of recent Discos Consumption

[Table 5-2](#) gives the monthly energy consumption and deficit amounts of Enugu Disco from July 2022 to June 2023. [Table 5-3](#) gives the monthly average of the figures in [Table 5-2](#) in MWh/h. During the period of July 2022 to June 2023, Enugu Disco was projected to receive an average of 414.00 MWh/h of electricity from the grid. However, it only received 287.98 MWh/h, which accounts for approximately 69.56% of the required energy. There was an average generation shortage of 91.78 MWh/h. TCN outages were responsible for 6.80 MWh/h and those of Enugu Disco was responsible for 27.44 MWh/h. This information is depicted in graphical form in [Figure 5-1](#).

Table 5-2: Monthly Energy Profile of Enugu Disco: July 2022 to June 2023



Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)
Jul-22	215,142,320	8,832,150	654,547	83,386,983	308,016,000
Aug-22	227,603,140	14,003,249	2,328,662	64,080,949	308,016,000
Sep-22	193,400,240	41,007,166	4,093,413	59,579,181	298,080,000
Oct-22	192,728,140	36,416,796	5,269,386	73,601,678	308,016,000
Nov-22	214,880,180	14,384,285	7,307,431	61,508,103	298,080,000
Dec-22	235,519,940	11,392,865	4,824,979	56,278,216	308,016,000
Jan-23	212,605,890	3,399,807	2,819,356	89,190,947	308,016,000
Feb-23	216,288,450	9,183,598	4,602,228	48,133,724	278,208,000
Mar-23	205,607,550	35,850,955	15,887,029	50,670,466	308,016,000
Apr-23	205,795,410	14,330,310	3,889,090	74,065,190	298,080,000
May-23	198,380,870	38,263,000	5,472,080	65,900,050	308,016,000
Jun-23	204,717,330	13,319,260	2,443,230	77,600,180	298,080,000
TOTAL	2,522,669,460	240,383,442	59,591,430	803,995,669	3,626,640,000

Table 5-3: Average Monthly Energy Profile of Enugu Disco: July 2022 to June 2023

Month	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	289.17	11.87	0.88	112.08	414.00
Aug-22	305.92	18.82	3.13	86.13	414.00
Sep-22	268.61	56.95	5.69	82.75	414.00
Oct-22	259.04	48.95	7.08	98.93	414.00
Nov-22	298.44	19.98	10.15	85.43	414.00
Dec-22	316.56	15.31	6.49	75.64	414.00
Jan-23	285.76	4.57	3.79	119.88	414.00
Feb-23	321.86	13.67	6.85	71.63	414.00
Mar-23	276.35	48.19	21.35	68.11	414.00
Apr-23	285.83	19.90	5.40	102.87	414.00
May-23	266.64	51.43	7.35	88.58	414.00
Jun-23	284.33	18.50	3.39	107.78	414.00
TOTAL	287.98	27.44	6.80	91.78	414.00



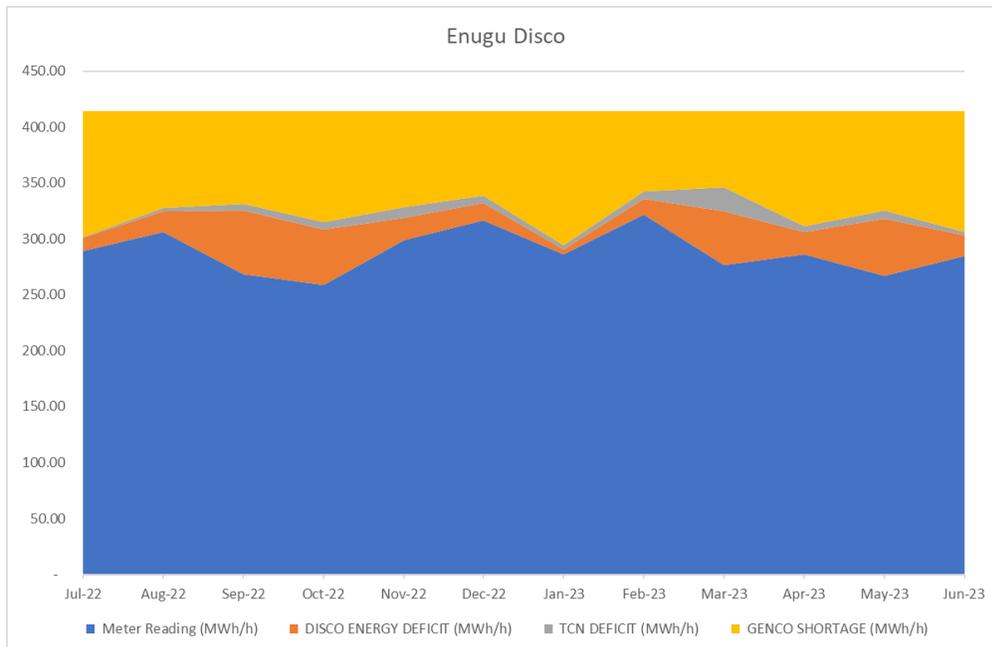


Figure 5-1: Energy Consumption and Deficits for Enugu Disco July 2023 to June 2023.

During the specified period, Enugu Disco experienced a generation shortage, resulting in 22.17% (91.78 MWh/h) of its required energy not being met. It is crucial for Enugu Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Enugu Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Enugu Disco to ensure adequate procurement of generation capacity to optimize the desired expanded transmission capacity.

### Outage Issues

The average level of feeder outages caused by Enugu Disco and TCN are given in Table 3-4. TCN will make efforts to reduce the losses at New-Haven, Owerri, Abakaliki and Nibo Awka.



Table 5-4: Enugu Disco's Outage Breakdown by Entity: January 2023 to June 2023

TCN STATION	ACTUAL (MWh)	FORECAST (MWh)	DISCO -VE (MWh)	DISCO +VE (MWh)	TCN -VE (MWh)
New-Haven 132kV Total	52.89	58.93	(7.78)	12.54	(4.66)
Owerri 132kV Total	40.87	47.46	(12.69)	11.48	(2.60)
Abakaliki 132kV Total	14.00	20.98	(10.82)	5.15	(0.81)
Nibo Awka 132kV Total	20.26	27.40	(8.95)	3.30	(0.74)
Umuahia 132kV Total	19.08	23.02	(7.09)	4.24	(0.45)
Agu Awka 132kV Total	19.84	23.04	(6.03)	3.31	(0.43)
Onitsha 132kV Total	59.57	75.75	(26.19)	13.62	(0.37)
Oji River 132kV Total	2.78	5.99	(3.49)	0.71	(0.27)
UNN Nsukka 132kV Total	11.46	10.92	(1.98)	2.64	(0.09)
GCM 132kV Total	18.52	15.63	(2.00)	5.33	(0.06)
Ugwuaji 132kV Total	12.27	11.46	(2.02)	2.84	(0.02)
Nkalagu 132kV Total	1.35	1.81	(0.90)	0.46	(0.01)
Itu 132kV Total	0.85	1.25	(0.77)	0.38	(0.01)
<b>Grand Total</b>	<b>273.75</b>	<b>323.64</b>	<b>(90.71)</b>	<b>66.00</b>	<b>(10.53)</b>



## 6 IBADAN DISCO

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### 6.1 Meeting with IBADAN Disco

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#### **Purpose of Meeting**

On January 31st, 2023, the TCN PIP Committee held a meeting with Ibadan Distribution Company (IBEDC) at the PWC Experience Centre. The primary purpose of the consultation meeting was to foster engagement between TCN and IBEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>5</sup> within the Ibadan Distribution Company (IBEDC) franchise area and told the IBEDC team to review and prioritize these projects based on IBEDC specific demands and priorities. TCN highlighted that the IBEDC team's input is crucial in determining the priority and justification for each project.

TCN also informed IBEDC that certain projects, such as those under the Service Level Agreement (SLA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that IBEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

#### **Project Selection Justification**

TCN suggested that IBEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: IBEDC should outline the specific objectives of each selected project. For example, IBEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network

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<sup>5</sup> Please see volume 1 for the list of projects



expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.

2. Justification for the Project: IBEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. IBEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.

3. Timeline for the Project: IBEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, IBEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and IBEDC, ensuring that the projects are aligned with IBEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to IBEDC**

IBEDC expressed its appreciation to TCN for the consultation meeting and acknowledged that most of the outlined projects effectively address the challenges faced by IBEDC. However, they highlighted the significance of the Otta substation to the IBEDC, as it serves as the industrial hub of Ogun State. IBEDC expressed concerns that TCN has not been meeting the daily load forecast made by IBEDC, resulting in many industrial customers in the area being left without power supply. Despite IBEDC's efforts to invest in constructing 33kV feeders to the Otta substation, the lack of a 33kV bay at the substation hampers their ability to utilize these feeders effectively.

The concerns expressed by IBEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with IBEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient project implementation, TCN and IBEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the IBEDC franchise area.

TCN provided an explanation stating that at times, the inadequate power generation leads to the National Control Center (NCC) allocating a load to the DISCOs that is lower than the originally forecasted demand. In light of this, TCN suggested that IBEDC should engage with NCC to investigate the underlying reasons for the challenges faced in meeting IBEDC's demand. Additionally, TCN advised IBEDC to consider signing a power purchase agreement with Generation Companies (Gencos) to secure a greater power supply, particularly for the identified viable demand from industrial customers. This approach would enable IBEDC to have more power available for distribution to its industrial customer base.



TCN observed that the encroachment of the Right of Way at Ayede substation poses challenges for implementing network expansion projects in the area, particularly as TCN intends to increase its capacity at the station. To address this issue, TCN requested collaboration with IBEDC to seek assistance from the State government in reclaiming the encroached land. TCN also agreed to share the contacts of its staff in the Wayleave and Environment Departments with IBEDC to facilitate the process of recovering the Right of Way. In the event that other efforts prove unsuccessful, it was agreed that the recovery efforts may be escalated to NERC for further action.

TCN expressed its optimism that the ongoing consultations and alignment efforts will yield positive results for the industry. TCN that the Nigerian Electricity Regulatory Commission (NERC) is dedicated to resolving the financing challenges by ensuring that the industry bears the cost of its projects, which will be integrated into the tariff structure. TCN appreciated the collaboration from all participants and urged them to continue working together to achieve full alignment of projects between TCN and IBEDC.

#### **Meeting Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and IBEDC can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the IBEDC franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.

TCN and IBEDC will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the IBEDC franchise area.



## 6.2 Ibadan Disco's Load Forecast

### Load Forecast

IBEDC submitted the load forecast given in Table 6-1 for planning purposes.

Table 6-1: Ibadan Disco Forecast for Year 2024 to 2028

TCN STATION	2024		2025		2026		2027		2028	
	Max (MW)	Ave (MW)								
Agbara	14.5	9.7	14.7	9.8	14.8	9.8	14.8	9.8	14.8	9.8
Oke-Aro	37.0	19.8	38.3	20.5	38.6	20.6	38.6	20.6	38.6	20.6
Abeokuta	100.0	60.5	105.8	74.5	108.1	83.7	109.3	89.8	110.3	93.9
New Abeokuta	34.5	22.3	35.5	25.3	35.7	26.8	35.8	27.6	35.8	28.1
Otta	108.6	69.4	112.6	84.2	113.6	94.1	114.0	100.8	114.1	105.4
Papalanto	45.4	31.9	46.2	35.4	46.4	36.9	46.5	37.6	46.5	37.9
Ganmo	91.0	45.8	96.9	50.3	98.9	52.2	99.6	53.0	99.8	53.4
Ilorin	111.2	61.5	116.7	75.0	118.4	84.6	119.0	91.9	119.2	97.7
Omu-Aran	32.8	17.6	33.8	23.2	33.9	27.5	34.0	31.0	34.0	33.9
Ayede	183.0	106.2	189.4	130.9	191.1	146.2	191.7	155.9	191.9	162.1
Ibadan-North	142.4	90.0	151.4	113.1	154.7	128.4	156.0	138.6	156.6	145.4
Ijebu-Ode	61.6	34.0	65.0	39.1	66.1	42.1	66.5	44.0	66.6	45.2
Iseyin	59.3	29.2	65.8	37.1	69.1	42.8	70.8	47.2	71.9	50.5
Iwo	23.4	12.6	26.6	17.3	28.0	21.2	28.7	24.5	29.1	27.2
Jericho	100.5	43.8	112.4	52.4	118.2	58.3	121.2	62.3	122.7	65.2
Mcpherson	6.8	2.1	9.5	2.5	12.2	2.8	14.9	3.0	17.6	3.1
Shagamu	70.1	35.0	74.0	43.3	75.3	48.8	75.7	52.5	75.9	55.1
Ile-Ife 132kV	62.4	24.4	70.4	26.7	76.0	28.3	80.2	29.6	83.3	30.6
Ilesha 132kV	59.4	32.7	64.8	42.3	67.6	49.5	69.4	55.0	70.7	59.4
Offa 132kV	23.7	13.2	25.4	17.5	26.1	20.7	26.4	23.2	26.5	25.2
Oshogbo 132kV	110.2	60.6	112.8	64.7	113.3	66.4	113.4	67.1	113.4	67.4
Jebba 132kV	33.4	16.5	34.8	17.6	35.2	17.9	35.4	18.0	35.4	18.0
Kainji 132kV	25.4	12.7	26.7	13.1	27.1	13.2	27.2	13.2	27.2	13.2
Total	62.4	24.4	70.4	26.7	76.0	28.3	80.2	29.6	83.3	30.6
Ilesha 132kV	59.4	32.7	64.8	42.3	67.6	49.5	69.4	55.0	70.7	59.4



Total	1536	851	1630	1016	1668	1123	1689	1196	1702	1249
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### Analysis of recent Discos Consumption

Table 6-2 gives the monthly energy consumption and deficit amounts of Ibadan Disco from July 2022 to June 2023. Table 6-3 gives the monthly average of the figures in Table 6-2 in MWh/h. During the period of July 2022 to June 2023, Ibadan Disco was projected to receive an average of 533.67 MWh/h of electricity from the grid. However, it only received 392.59 MWh/h, which accounts for approximately 73.56% of the required energy. There was an average generation shortage of 122.27 MWh/h. TCN outages were responsible for 4.37 MWh/h and those of Ibadan Disco was responsible for 14.43 MWh/h. This information is depicted in graphical form in Figure 6-1.

Table 6-2: Monthly Energy Profile of Ibadan Disco: July 2022 to June 2023

Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)
Jul-22	288,840,180.00	2,847,421.86	527,117.86	104,833,280.28	397,048,000
Aug-22	293,053,250.00	16,349,520.12	952,273.27	86,692,956.61	397,048,000
Sep-22	283,225,490.00	16,654,127.51	2,373,918.84	81,986,463.66	384,240,000
Oct-22	281,222,840.00	13,135,504.42	9,128,755.28	93,560,900.30	397,048,000
Nov-22	305,322,450.00	3,218,565.40	794,726.18	74,904,258.42	384,240,000
Dec-22	321,720,570.00	2,825,981.46	848,014.68	71,653,433.86	397,048,000
Jan-23	277,813,860.00	-	-	119,234,140.00	397,048,000
Feb-23	273,843,440.00	8,166,133.31	2,968,507.25	73,645,919.44	358,624,000
Mar-23	298,171,780.00	29,177,870.81	4,466,380.49	65,231,968.70	397,048,000
Apr-23	270,978,130.00	2,652,960.00	4,574,300.00	106,034,610.00	384,240,000
May-23	281,885,190.00	18,528,740.00	7,442,930.00	89,191,140.00	397,048,000
Jun-23	262,986,390.00	12,880,590.00	4,215,200.00	104,157,820.00	384,240,000
TOTAL	3,439,063,570	126,437,415	38,292,124	1,071,126,891	4,674,920,000

Table 6-3: Average Monthly Energy Profile of Ibadan Disco: July 2022 to June 2023

Month	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	388.23	3.83	0.71	140.90	533.67
Aug-22	393.89	21.98	1.28	116.52	533.67
Sep-22	393.37	23.13	3.30	113.87	533.67
Oct-22	377.99	17.66	12.27	125.75	533.67
Nov-22	424.06	4.47	1.10	104.03	533.67
Dec-22	432.42	3.80	1.14	96.31	533.67
Jan-23	373.41	-	-	160.26	533.67
Feb-23	407.51	12.15	4.42	109.59	533.67



Mar-23	400.77	39.22	6.00	87.68	533.67
Apr-23	376.36	3.68	6.35	147.27	533.67
May-23	378.88	24.90	10.00	119.88	533.67
Jun-23	365.26	17.89	5.85	144.66	533.67
<b>TOTAL</b>	<b>392.59</b>	<b>14.43</b>	<b>4.37</b>	<b>122.27</b>	<b>533.67</b>

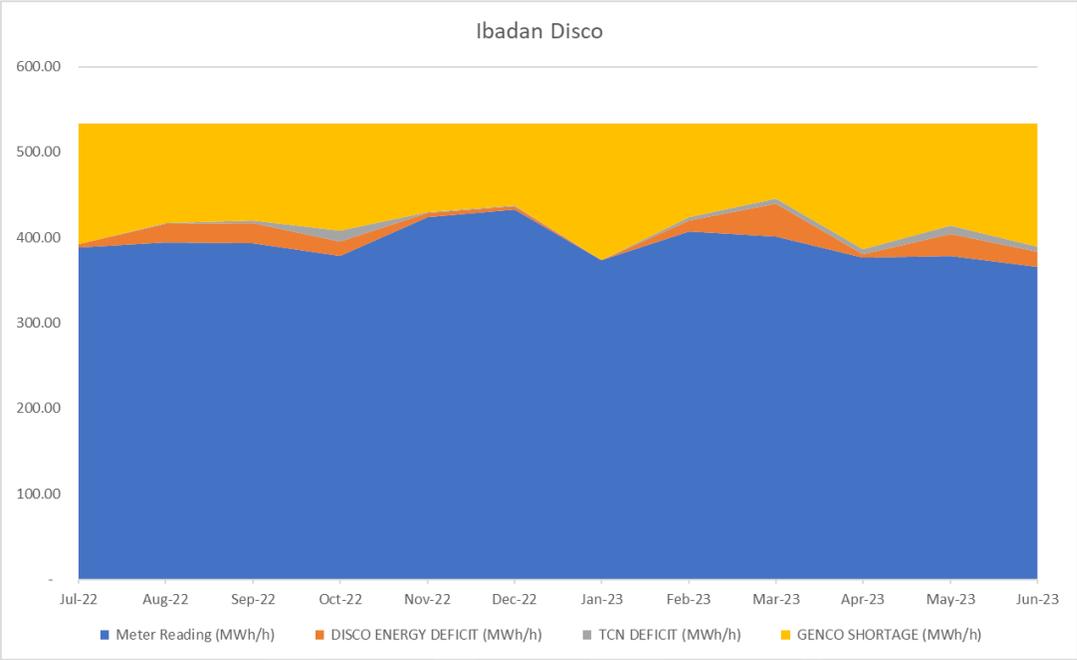


Figure 6-1: Energy Consumption and Deficits for Ibadan Disco July 2023 to June 2023.

During the specified period, Ibadan Disco experienced a generation shortage, resulting in 22.91% (122.27 MWh/h) of its required energy not being met. It is crucial for Ibadan Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Ibadan Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Ibadan Disco to ensure adequate procurement of generation capacity to optimize the desired expanded transmission capacity.

The load forecast provided by Ibadan Disco does not align with its historical consumption patterns and represents a significant departure from its established consumption levels. This indicates a substantial change in the anticipated load requirements for Ibadan Disco. It is important for Ibadan Disco to carefully analyze and validate the load forecast to ensure its accuracy and reliability.

**Outage Issues**

The average level of feeder outages caused by Ibadan Disco and TCN are given in Table 6-4. From the table, TCN recognizes high downtime level at the Ibadan-North, Ayede, Shagamu,



Jericho and Ijebu Ode substations. To address these issues, TCN will prioritize the resolution of maintenance-related challenges in these substations.

Table 6-4: Ibadan Disco's Outage Breakdown by Entity: January 2023 to June 2023

TCN STATION	ACTUAL (MWh/h)	FORECAST (MWh/h)	DISCO -VE (MWh/h)	DISCO +VE (MWh/h)	TCN -VE (MWh/h)
Ibadan-North	26.92	48.43	(20.15)	5.10	(3.77)
Ayede	46.84	78.67	(33.81)	6.52	(2.11)
Shagamu	12.23	22.66	(12.57)	3.17	(0.83)
Jericho	18.57	19.88	(5.35)	4.84	(0.62)
Ijebu-Ode	13.83	19.53	(8.98)	4.09	(0.49)
Ilorin	17.63	31.66	(18.34)	4.88	(0.43)
Abeokuta	21.39	34.85	(14.31)	5.17	(0.39)
Oke-Aro	9.56	16.91	(7.91)	1.14	(0.26)
Papalanto	8.91	18.17	(9.48)	2.16	(0.23)
Otta	38.73	40.40	(9.18)	12.62	(0.23)
Ganmo	30.51	36.17	(10.84)	7.76	(0.20)
Iseyin	7.65	15.92	(8.51)	1.18	(0.19)
Ilesha	10.56	20.65	(11.49)	1.88	(0.17)
Ile-Ife	16.39	17.96	(5.85)	4.75	(0.17)
Jebba	10.99	11.44	(3.01)	2.72	(0.16)
Offa	6.39	7.61	(2.25)	1.20	(0.16)
Agbara	2.91	9.18	(5.52)	0.25	(0.16)
Oshogbo	42.42	44.35	(13.97)	12.23	(0.15)
NewAbeokuta	8.69	20.74	(10.49)	0.34	(0.11)
Iwo	4.56	7.58	(3.38)	0.72	(0.10)
Omu-Aran	5.51	8.02	(3.69)	1.25	(0.07)
Mcperson	2.13	0.91	(0.06)	1.29	(0.02)
Kainji	2.64	3.19	(1.03)	0.48	(0.00)
<b>Total</b>	<b>365.97</b>	<b>534.88</b>	<b>(220.18)</b>	<b>85.75</b>	<b>(11.03)</b>



### 7.1 Meeting with IKEJA Disco

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#### **Purpose of Meeting**

On February 1, 2023, the TCN PIP Committee held a meeting with Ikeja Distribution Company (IKEDC) at the PWC Experience Centre. The primary purpose of the consultation meeting was to foster engagement between TCN and IKEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>6</sup> within the Ikeja Distribution Company (IKEDC) franchise area and told the IKEDC team to review and prioritize these projects based on IKEDC specific demands and priorities. TCN highlighted that the IKEDC team's input is crucial in determining the priority and justification for each project.

TCN also informed IKEDC that certain projects, such as those under the Service Level Agreement (SLA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that IKEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

#### **Project Selection Justification**

TCN suggested that IKEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: IKEDC should outline the specific objectives of each selected project. For example, IKEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.

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<sup>6</sup> Please see volume 1 for the list of projects



2. Justification for the Project: IKEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. IKEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.

3. Timeline for the Project: IKEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, IKEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and IKEDC, ensuring that the projects are aligned with IKEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to IKEDC**

IKEDC expressed gratitude to TCN for initiating the meeting. However, IKEDC raised concerns about the delayed progress of the planned NDPHC project, which involves a 132kV multi-circuit from Oke Aro substation to Alausa, due to corridor issues. The completion of this project is expected to significantly enhance energy delivery to Alausa and Ogba.

Additionally, IKEDC highlighted the importance of the planned upgrades at the Maryland substation, where the capacity is set to increase from 30 to 100MVA, and the Ilupeju substation, where the capacity will be upgraded from 2X15MVA to 60MVA. These upgrades are identified as crucial for meeting the growing demand for increased energy delivery in the respective areas served by the substations.

The concerns expressed by IKEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with IKEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient project implementation, TCN and IKEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the IKEDC franchise area.

TCN responded by mentioning that they have been actively engaging with the Lagos and Ogun state governments regarding the availability of corridors for most of the projects. However, they expressed their commitment to collaborate with IKEDC in future engagements with the state government to further strengthen the case for the allocation of corridors specifically for power projects.

Regarding the planned upgrade at the Maryland substation, TCN stated that there is currently no available space for additional bays. However, IKEDC requested the project to increase the capacity on its existing feeders. Therefore, there is a need to reconfigure some feeders in



order to accommodate the increased capacity and successfully deliver the enhanced power supply.

Additionally, TCN and IKEDC need to reassess the upgrade of the 2X15MVA 132/11kV to 60MVA 132/33kV at Ilupeju Substation. This reassessment is necessary to determine the most effective approach for providing 33kV bays, considering that the existing bays at the substation are currently configured for 11kV.

In light of this, IKEDC requested a site visit with TCN to reassess the Ilupeju project. This visit will enable both parties to evaluate the project in detail and gather necessary information before IKEDC provides feedback on its prioritized projects list.

By conducting the site visit and reassessing the project, TCN and IKEDC can collaborate more effectively to ensure the successful implementation of the upgrade at Ilupeju Substation and address the technical considerations associated with providing 33kV bays.

TCN expressed its optimism that the ongoing consultations and alignment efforts will yield positive results for the industry. TCN that the Nigerian Electricity Regulatory Commission (NERC) is dedicated to resolving the financing challenges by ensuring that the industry bears the cost of its projects, which will be integrated into the tariff structure. TCN appreciated the collaboration from all participants and urged them to continue working together to achieve full alignment of projects between TCN and IKEDC.

#### **Meeting Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and IKEDC can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the IKEDC franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.

TCN and IKEDC will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the IKEDC franchise area.



## 7.2 Ikeja Disco's Load Forecast

### Load Forecast

IKEDC submitted the load forecast given in [Table 7-1](#) for planning purposes.

Table 7-1: Ikeja Disco Forecast for Year 2024 to 2028

TCN STATION	2024		2025		2026		2027		2028	
	Max (MW)	Ave (MW)	Max (MW)	Ave (MW)	Max (MW)	Ave (MW)	Max (MW)	Ave (MW)	Max (MW)	Ave (MW)
Amuwo-Odofin	33	12.5	35	13.5	37	14.5	39	15.5	41	16.5
Oworonshoki	68.4	40.8	86.4	49.8	88.4	50.8	90.4	51.8	92.4	52.8
Akoka	10.2	4.9	22.2	10.9	24.2	11.9	26.2	12.9	28.2	13.9
Ilupeju	46.2	23.2	50.2	25.2	52.2	26.2	54.2	27.2	56.2	28.2
Isolo	53	22.2	57	24.2	63	27.2	65	28.2	67	29.2
Itire	51.7	28.3	55.7	30.3	57.7	31.3	59.7	32.3	71.7	38.3
Alausa	80.8	49.9	86.8	52.9	88.8	53.9	90.8	54.9	92.8	55.9
Alimosho	78.2	43.4	80.2	44.4	104.2	56.4	106.2	57.4	112.2	60.4
Ayobo	66.3	33.6	69.8	35.35	71.8	36.35	77.8	39.35	79.8	40.35
Ejigbo	114.9	66.6	116.9	67.6	118.9	68.6	148.9	83.6	150.9	84.6
Ogba	90.5	52.9	96.5	55.9	102.5	58.9	104.5	59.9	106.5	60.9
Oke-Aro	60	31.9	62	32.9	74	38.9	76	39.9	82	42.9
Otta	23	9.5	25	10.5	28.5	12.25	30.5	13.25	36.5	16.25
Ikorodu	134.7	81	136.7	82	142.7	85	144.7	86	156.7	92
Egbin	24	11.6	26	12.6	28	13.6	30	14.6	32	15.6
Maryland	59.2	36.3	61.2	37.3	63.2	38.3	73.2	43.3	75.2	44.3
Odogunyan	54.5	31	56.5	32	58.5	33	64.5	36	76.5	42
<b>Total</b>	<b>1048.6</b>	<b>579.6</b>	<b>1124.1</b>	<b>617.35</b>	<b>1203.6</b>	<b>657.1</b>	<b>1281.6</b>	<b>696.1</b>	<b>1357.6</b>	<b>734.1</b>

### Analysis of recent Discos Consumption

[Table 7-2](#) gives the monthly energy consumption and deficit amounts of Ikeja Disco from July 2022 to June 2023. [Table 7-3](#) gives the monthly average of the figures in [Table 7-2](#) in MWh/h. During the period of July 2022 to June 2023, Ikeja Disco was projected to receive an average of 603.33 MWh/h of electricity from the grid. However, it only received 502.81 MWh/h, which accounts for approximately 83.34% of the required energy. There was an average generation shortage of 91.34 MWh/h. TCN outages were responsible for 3.08 MWh/h and those of Ikeja Disco was responsible for 6.11 MWh/h. This information is depicted in graphical form in [Figure 7-1](#).



Table 7-2: Monthly Energy Profile of Ikeja Disco: July 2022 to June 2023

Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)
Jul-22	310,279,810	12,826,050	576,472	125,197,668	448,880,000
Aug-22	354,240,410	6,526,742	2,276,314	85,836,534	448,880,000
Sep-22	363,973,770	2,802,087	744,110	66,880,033	434,400,000
Oct-22	343,228,440	-	1,717,092	103,934,468	448,880,000
Nov-22	367,686,220	-	-	66,713,780	434,400,000
Dec-22	404,634,930	-	-	44,245,070	448,880,000
Jan-23	360,398,140	-	-	88,481,860	448,880,000
Feb-23	366,112,500	-	375,150	38,952,350	405,440,000
Mar-23	415,401,500	1,836,988	3,729,565	27,911,946	448,880,000
Apr-23	361,913,610	-	1,217,550	71,268,840	434,400,000
May-23	380,390,990	8,290,810	1,774,140	58,424,060	448,880,000
Jun-23	376,356,030	21,201,140	14,566,400	22,276,430	434,400,000
<b>TOTAL</b>	<b>4,404,616,350</b>	<b>53,483,817</b>	<b>26,976,794</b>	<b>800,123,040</b>	<b>5,285,200,000</b>

Table 7-3: Average Monthly Energy Profile of Ikeja Disco: July 2022 to June 2023

Month	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	417.04	17.24	0.77	168.28	603.33
Aug-22	476.13	8.77	3.06	115.37	603.33
Sep-22	505.52	3.89	1.03	92.89	603.33
Oct-22	461.33	-	2.31	139.70	603.33
Nov-22	510.68	-	-	92.66	603.33
Dec-22	543.86	-	-	59.47	603.33
Jan-23	484.41	-	-	118.93	603.33
Feb-23	544.81	-	0.56	57.96	603.33
Mar-23	558.34	2.47	5.01	37.52	603.33
Apr-23	502.66	-	1.69	98.98	603.33
May-23	511.28	11.14	2.38	78.53	603.33
Jun-23	522.72	29.45	20.23	30.94	603.33
<b>TOTAL</b>	<b>502.81</b>	<b>6.11</b>	<b>3.08</b>	<b>91.34</b>	<b>603.33</b>



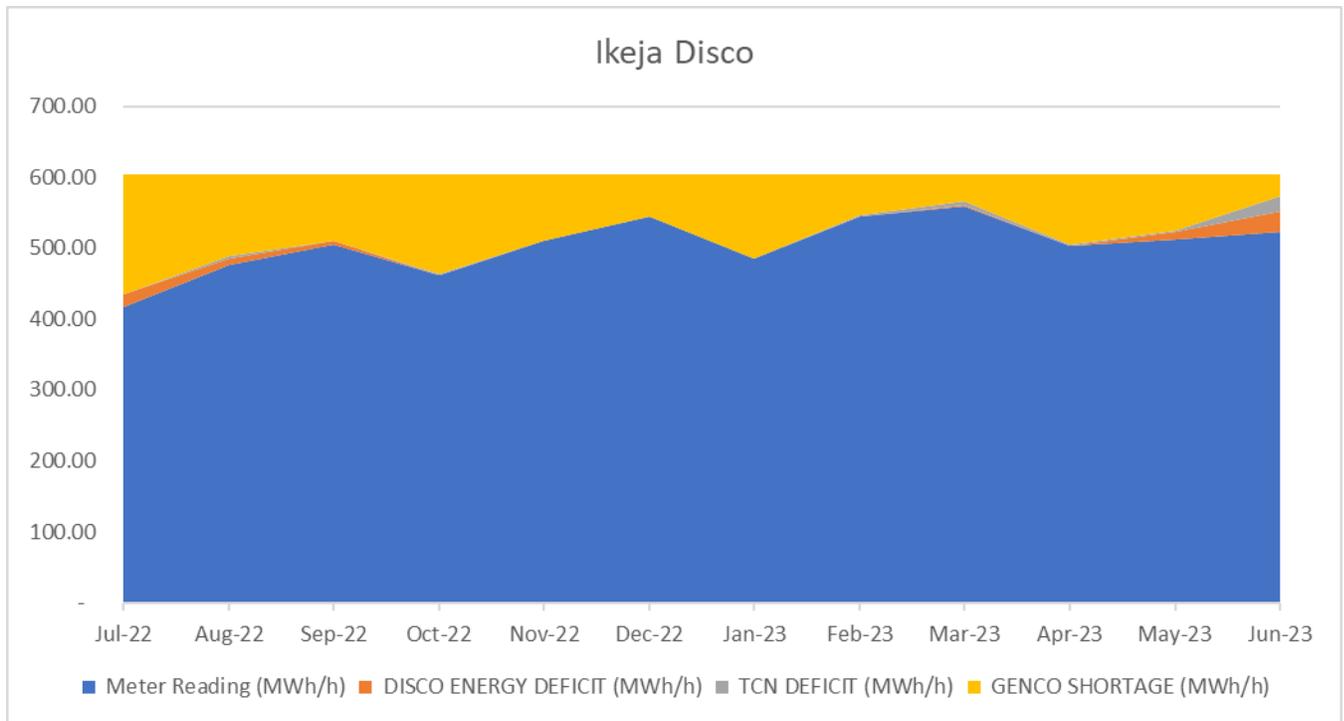


Figure 7-1: Energy Consumption and Deficits for Ikeja Disco July 2023 to June 2023.

During the specified period, Ikeja Disco experienced a generation shortage, resulting in 15.14% (91.34 MWh/h) of its required energy not being met. It is crucial for Ikeja Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Ikeja Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Ikeja Disco to ensure adequate procurement of generation capacity to optimize the desired expanded transmission capacity.

### Outage Issues

The average level of feeder outages caused by Ikeja Disco and TCN are given in Table 7-4. From the table, TCN recognizes high downtime level at the Ejigbo, Ogba, Alausa, Ikorodu, and Alimosho substations. To address these issues, TCN will prioritize the resolution of maintenance-related challenges in these substations.

Table 7-4: Ikeja Disco's Outage Breakdown by Entity: January 2023 to June 2023

TCN STATION	ACTUAL (MWh/h)	FORECAST (MWh/h)	DISCO -VE (MWh/h)	DISCO +VE (MWh/h)	TCN -VE (MWh/h)
Ejigbo	63.90	80.24	(20.52)	9.55	(2.21)
Ogba	54.94	66.33	(17.21)	10.74	(2.13)
Alausa	45.97	61.61	(15.37)	4.08	(1.78)
Ikorodu	63.20	77.59	(25.47)	18.08	(1.35)
Alimosho	45.19	61.26	(15.49)	5.92	(1.33)
Itire	22.86	31.68	(10.01)	2.23	(0.71)



Maryland	36.19	41.20	(11.51)	7.44	(0.68)
Oke-Aro	30.08	33.49	(8.53)	6.70	(0.64)
Odogunyan	19.42	18.05	(2.65)	6.21	(0.64)
Oworonshoki	41.44	43.11	(9.11)	8.29	(0.39)
Amuwo-Odofin	6.83	12.49	(4.73)	0.83	(0.34)
Isolo	18.17	16.15	(4.86)	7.48	(0.34)
Ayobo	33.75	36.84	(6.90)	7.05	(0.29)
Ilupeju	23.15	30.07	(9.02)	2.74	(0.15)
Otta	7.42	13.87	(5.45)	1.51	(0.11)
Egbin	9.12	6.76	(1.60)	4.08	(0.10)
Akoka	3.06	2.85	(1.64)	1.87	(0.01)
<b>Total</b>	<b>524.73</b>	<b>633.62</b>	<b>(170.09)</b>	<b>104.80</b>	<b>(13.21)</b>

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### 8.1 Meeting with JOS Disco

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#### **Purpose of Meeting**

On February 8, 2023, the TCN PIP Committee held a meeting with Jos Distribution Company (JEDC) at the TCN Corporate Headquarters. The primary purpose of the consultation meeting was to foster engagement between TCN and JEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>7</sup> within the Jos Distribution Company (JEDC) franchise area and told the JEDC team to review and prioritize these projects based on JEDC specific demands and priorities. TCN highlighted that the JEDC team's input is crucial in determining the priority and justification for each project.

TCN also informed JEDC that certain projects, such as those under the Service Level Agreement (SLA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that JEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

#### **Project Selection Justification**

TCN suggested that JEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: JEDC should outline the specific objectives of each selected project. For example, JEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.

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<sup>7</sup> Please see volume 1 for the list of projects



2. Justification for the Project: JEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. JEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.

3. Timeline for the Project: JEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, JEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and JEDC, ensuring that the projects are aligned with JEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to JEDC**

JEDC expressed gratitude to TCN for the consultation meeting and emphasized the importance of alignment between TCN and JEDC. It was observed that most of the mentioned projects are currently addressing or will address the urgent needs of JEDC. However, there is an urgent requirement for the completion of the Biliri substation, as the community is currently reliant on a 500km long 33kV feeder, resulting in poor quality power supply to Biliri and its surroundings.

Furthermore, the completion of the Makeri-Pankshin 132kV line holds critical significance for JEDC. Presently, only one 33kV feeder supplies power to 13 out of the 17 Local Government Areas in the state. To prepare for the completion of the project, JEDC has proposed the implementation of six 33kV feeders radiating from the Pankshin substation.

Additionally, another priority project is the completion of the second Jos-Kaduna 330kV line, along with the finalization of the Bauchi 330kV substation. These projects are of utmost importance for JEDC as they contribute to the enhancement of power transmission and distribution in the region.

The concerns expressed by JEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with JEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient project implementation, TCN and JEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the JEDC franchise area.

TCN responded by reiterating that the objective of the meeting is to evaluate ongoing projects and identify those that address the immediate needs of the DISCOs, allowing for prioritization. They acknowledged the importance of completing the Biliri substation, with a proposed commissioning date set for March 2023. TCN informed that the minor variation requested by the contractor has been approved, indicating progress in the project.



Regarding the Makeri-Pankshin 132kV line, TCN acknowledged its priority and recognized that vandalism of TCN infrastructure in the area has caused delays. Collaborative efforts have been made with the state government to raise awareness among the community, emphasizing the need to refrain from vandalizing TCN facilities. The contractor is back on-site, and TCN is committed to completing the project as soon as possible.

As for the second Jos-Kaduna 330kV line and the Bauchi 330kV substation, TCN provided assurance that these projects are nearing completion. This indicates significant progress towards enhancing power transmission and distribution in the respective areas.

TCN's response highlights the specific updates and efforts undertaken to address the pressing needs identified by JEDC, demonstrating a commitment to resolving key issues and ensuring the timely completion of important projects.

TCN expressed its optimism that the ongoing consultations and alignment efforts will yield positive results for the industry. TCN emphasized that the Nigerian Electricity Regulatory Commission (NERC) is dedicated to resolving the financing challenges by ensuring that the industry bears the cost of its projects, which will be integrated into the tariff structure. TCN appreciated the collaboration from all participants and urged them to continue working together to achieve full alignment of projects between TCN and JEDC.

#### **Meeting Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and JEDC can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the JEDC franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.

TCN and JEDC will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the JEDC franchise area.



## 8.2 Jos Disco's Load Forecast

### Load Forecast

JEDC submitted the load forecast given in [Table 8-1](#) for planning purposes.

**Table 8-1: Jos Disco Forecast for Year 2024 to 2028**

TCN STATION	2024		2025		2026		2027		2028	
	Max (MW)	Ave (MW)								
Ashaka 132kV	14	9.17	14	9.17	15	9.83	15.50	10.16	16.00	10.48
Gombe 132kV	60	31.31	70	46.29	75	49.75	75.00	50.97	80.00	52.07
Bauchi 132kV	65	39.82	70	41.87	70	48.69	75.00	52.92	75.00	53.86
Jos 132kV	80	47.47	85	53.60	90	60.02	90.00	60.36	105.00	67.15
Makeri 132kV	70	41.79	76	51.53	80	51.06	85.00	53.77	85.00	53.45
Apir 132kV	57	34.20	61	36.90	63	38.79	66.00	43.55	66.00	44.29
Otuokpo 132kV	25	12.16	17	10.80	17	10.96	20.00	11.69	22.00	13.43
Yandev 132kV	56	30.49	65	38.55	70	43.60	75.00	42.92	75.00	43.89
Azare 132kV	18	10.90	21	9.14	23	10.42	23.00	10.50	25.00	11.45
Total	445	257.32	479	297.84	503	323.12	524.50	336.84	549.00	350.07

### Analysis of recent Discos Consumption

[Table 8-2](#) gives the monthly energy consumption and deficit amounts of Jos Disco from July 2022 to June 2023. [Table 8-3](#) gives the monthly average of the figures in [Table 8-2](#) in MWh/h. During the period of July 2022 to June 2023, Jos Disco was projected to receive an average of 251.67 MWh/h of electricity from the grid. However, it only received 181.80 MWh/h, which accounts for approximately 72.24% of the required energy. There was an average generation shortage of 53.28 MWh/h. TCN outages were responsible for 1.41 MWh/h and those of Jos Disco was responsible for 15.98 MWh/h. This information is depicted in graphical form in [Figure 8-1](#).

**Table 8-2: Monthly Energy Profile of Jos Disco: July 2022 to June 2023**

Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)	Total (MWh/h)
Jul-22	125,944,600.00	1,002,796.59	71,193.08	60,221,410.33	187,240,000	251.67
Aug-22	127,159,340.00	18,438,086.93	704,974.57	40,937,598.50	187,240,000	251.67
Sep-22	127,431,120.00	19,287,500.04	195,110.28	34,286,269.67	181,200,000	251.67
Oct-22	142,912,410.00	8,059,068.58	507,230.00	35,761,291.42	187,240,000	251.67
Nov-22	141,650,740.00	8,457,627.45	449,648.07	30,641,984.48	181,200,000	251.67
Dec-22	153,070,900.00	8,940,113.84	2,286,570.00	22,942,416.16	187,240,000	251.67
Jan-23	141,088,650.00	4,727,449.35	13,230.00	41,410,670.65	187,240,000	251.67
Feb-23	136,383,700.00	7,540,997.00	76,393.00	25,118,910.00	169,120,000	251.67
Mar-23	138,402,850.00	17,660,344.72	2,960,959.00	28,215,846.28	187,240,000	251.67
Apr-23	130,775,880.00	7,475,980.00	1,992,580.00	40,955,560.00	181,200,000	251.67
May-23	122,446,770.00	23,843,770.00	2,713,450.00	38,236,010.00	187,240,000	251.67
Jun-23	105,294,860.00	7,530,520.00	373,540.00	68,001,080.00	181,200,000	251.67
TOTAL	1,592,561,820	132,964,254	12,344,878	466,729,047	2,204,600,000	251.67



Table 8-3: Average Monthly Energy Profile of Jos Disco: July 2022 to June 2023

Month	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	169.28	1.35	0.10	80.94	251.67
Aug-22	170.91	24.78	0.95	55.02	251.67
Sep-22	176.99	26.79	0.27	47.62	251.67
Oct-22	192.09	10.83	0.68	48.07	251.67
Nov-22	196.74	11.75	0.62	42.56	251.67
Dec-22	205.74	12.02	3.07	30.84	251.67
Jan-23	189.64	6.35	0.02	55.66	251.67
Feb-23	202.95	11.22	0.11	37.38	251.67
Mar-23	186.03	23.74	3.98	37.92	251.67
Apr-23	181.63	10.38	2.77	56.88	251.67
May-23	164.58	32.05	3.65	51.39	251.67
Jun-23	146.24	10.46	0.52	94.45	251.67
TOTAL	181.80	15.18	1.41	53.28	251.67

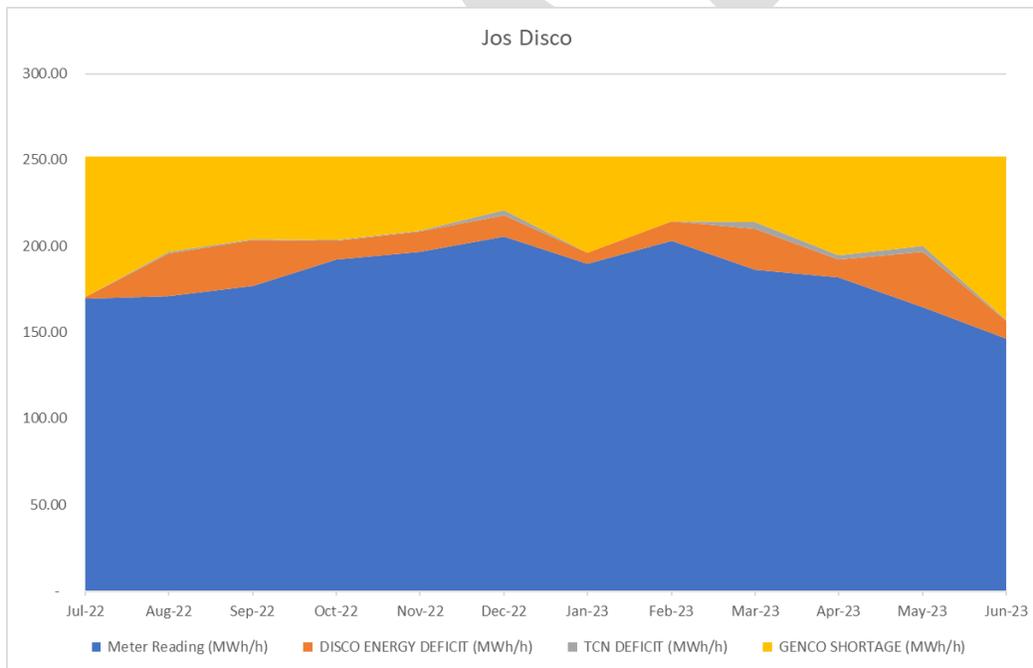


Figure 8-1: Energy Consumption and Deficits for Jos Disco July 2023 to June 2023.

During the specified period, Jos Disco experienced a generation shortage, resulting in 21.17% (53.28 MWh/h) of its required energy not being met. It is crucial for Jos Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Jos Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Jos Disco to ensure



adequate procurement of generation capacity to optimize the desired expanded transmission capacity.

### Outage Issues

The average level of feeder outages caused by Jos Disco and TCN are given in [Table 3-4](#).

[Table 8-4: Jos Disco's Outage Breakdown by Entity: January 2023 to June 2023](#)

TCN STATION	ACTUAL (MWh)	FORECAST (MWh)	DISCO -VE (MWh)	DISCO +VE (MWh)	TCN -VE (MWh)
Apir 132kV	28.57	28.57	(5.39)	5.80	(0.28)
Azare 132kV	5.61	5.60	(1.07)	1.77	(0.26)
Yandev 132kV	18.42	22.85	(9.24)	5.93	(0.23)
Otukpo 132kV	9.90	11.05	(3.19)	2.49	(0.11)
Jos 132kV	35.01	39.25	(9.35)	5.81	(0.08)
Makeri 132kV	25.24	26.63	(4.68)	4.22	(0.05)
Bauchi 132kV	24.13	25.29	(6.82)	6.16	(0.04)
Gombe 132kV	25.67	25.02	(7.74)	9.47	(0.03)
Ashaka 132kV	9.62	10.53	(1.89)	0.99	-
<b>Grand Total</b>	182.17	194.79	(49.38)	42.64	(1.07)



### 9.1 Meeting with KADUNA Disco

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#### **Purpose of Meeting**

On February x, 2023, the TCN PIP Committee held a meeting with Kaduna Distribution Company (KAEDC) at the TCN Corporate Headquarters. The primary purpose of the consultation meeting was to foster engagement between TCN and KAEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>8</sup> within the Kaduna Distribution Company (KAEDC) franchise area and told the KAEDC team to review and prioritize these projects based on KAEDC specific demands and priorities. TCN highlighted that the KAEDC team's input is crucial in determining the priority and justification for each project.

TCN also informed KAEDC that certain projects, such as those under the Service Level Agreement (SLA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that KAEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

#### **Project Selection Justification**

TCN suggested that KAEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: KAEDC should outline the specific objectives of each selected project. For example, KAEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.

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<sup>8</sup> Please see volume 1 for the list of projects



2. Justification for the Project: KAEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. KAEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.

3. Timeline for the Project: KAEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, KAEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and KAEDC, ensuring that the projects are aligned with KAEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to KAEDC**

KAEDC expressed gratitude to TCN for the consultation meeting and emphasized the importance of alignment between TCN and KAEDC. It was noted that most of the mentioned projects are currently addressing or will address the urgent needs of KAEDC. However, the completion of the Kaduna Power Plant (Kudenda)-Mando road 132kV transmission line holds high priority for KAEDC. To address the issue of corridor availability, discussions are underway with FGN Power to explore the use of multi-circuit 33kV towers. This transmission line is especially crucial as KAEDC is in a franchise partnership with the Kudenda power plant.

Additionally, the completion of the Millenium City 330/132kV substation and the 132kV line from Millenium City to Rigasa are identified as priority projects for KAEDC. These projects are essential for enhancing power transmission and distribution in the respective areas.

Regarding the PPI project for additional 60MVA capacity to the Talata Mafara substation, KAEDC expressed that the current capacity in the substation is sufficient to meet the demand in the area. Thus, the need for the additional capacity may not be necessary.

Furthermore, the 33kV feeder to Kachia is plagued by reliability issues due to numerous tee-offs. Therefore, the completion of the Kachia substation is a priority for KAEDC, as it would contribute to resolving these challenges and improve the reliability of power supply in the area.

KAEDC's observations highlight specific projects and areas of concern, emphasizing their importance for meeting the power supply needs and ensuring reliable service delivery to their customers.

The concerns expressed by KAEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with KAEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient



project implementation, TCN and KAEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the KAEDC

TCN responded by reiterating that the objective of the meeting is to evaluate ongoing projects and identify those that address the immediate needs of the DISCOs, allowing for proper prioritization. TCN acknowledged the importance of completing the Kaduna Power Plant (Kudenda)-Mando 132kV transmission line and assured KAEDC that necessary actions will be taken to ensure the timely completion of the project.

Regarding the Millenium City-Rigasa 132kV line, TCN informed KAEDC that it is an AFD (Agence Française de Développement) project, and the procurement process for the project has already commenced. TCN provided an estimated completion timeline of two years for the project..

TCN's response highlights the specific updates and efforts undertaken to address the pressing needs identified by KAEDC, demonstrating a commitment to resolving key issues and ensuring the timely completion of important projects.

TCN expressed its optimism that the ongoing consultations and alignment efforts will yield positive results for the industry. TCN that the Nigerian Electricity Regulatory Commission (NERC) is dedicated to resolving the financing challenges by ensuring that the industry bears the cost of its projects, which will be integrated into the tariff structure. TCN appreciated the collaboration from all participants and urged them to continue working together to achieve full alignment of projects between TCN and KAEDC.

#### **Meeting Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and KAEDC can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the KAEDC franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.

TCN and KAEDC will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the KAEDC franchise area.

## **9.2 Kaduna Disco's Load Forecast**

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### **Load Forecast**

Kaduna Disco submitted the load forecast given in [Table 9-1](#) for planning purposes.



Table 9-1: Kaduna Disco Forecast for Year 2024 to 2028

#	TCN STATION	2024		2025		2026		2027		2028	
		Ave(MW)	Max(MW)								
1	Kafanchan 132kV	4.11	5.16	4.89	8.15	6.35	16.19	9.01	40.42	13.95	126.83
2	Gusau 132kV	14.01	15.53	17.00	19.07	22.72	25.96	33.46	39.17	54.28	65.49
3	Kaduna Town 132kV	58.13	62.96	63.87	73.85	73.55	93.83	88.79	129.13	112.36	192.46
4	Mando 132kV	80.36	85.88	97.30	98.08	129.61	119.70	189.98	156.11	306.40	217.58
5	Talata-Mafara 132kV	4.89	5.37	5.29	6.47	5.96	8.55	6.97	12.41	8.49	19.76
6	Zaria 132kV	28.91	31.38	31.66	36.96	36.28	47.24	43.51	65.54	54.61	98.69
7	Tegina 132kV	1.80	1.97	2.25	2.39	3.17	3.17	5.00	4.63	8.83	7.44
8	Birnin-Kebbi 132kV	28.54	33.18	38.78	44.84	61.42	70.47	113.39	128.74	244.02	273.43
9	Sokoto 132kV	25.02	29.55	29.48	41.24	37.71	67.97	52.35	132.32	78.90	304.31
10	Yauri 132kV	5.44	6.61	6.78	9.74	9.43	17.44	14.63	37.91	25.36	100.09
	TOTAL	251.20	277.58	297.29	340.79	386.20	470.53	557.11	746.39	907.19	1406.08

### Analysis of recent Discos Consumption

Table 9-2 gives the monthly energy consumption and deficit amounts of Kaduna Disco from July 2022 to June 2023. Table 9-3 gives the monthly average of the figures in Table 9-2 in MWh/h. During the period of July 2022 to June 2023, Kaduna Disco was projected to receive an average of 288.33 MWh/h of electricity from the grid. However, it only received 219.18 MWh/h, which accounts for approximately 76.02% of the required energy. There was an average generation shortage of 64.68 MWh/h. TCN outages were responsible for 1.31 MWh/h and those of Kaduna Disco was responsible for 3.16 MWh/h. This information is depicted in graphical form in Figure 9-1.

Table 9-2: Monthly Energy Profile of Kaduna Disco: July 2022 to June 2023

Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)
Jul-22	153,273,570.00	1,049,804.28	663,810.83	59,532,814.89	214,520,000
Aug-22	175,729,010.00	2,440,868.00	506,390.00	35,843,732.00	214,520,000
Sep-22	169,817,530.00	2,215,093.39	1,222,354.56	34,345,022.05	207,600,000
Oct-22	182,235,060.00	-	-	32,284,940.00	214,520,000
Nov-22	177,838,550.00	-	-	29,761,450.00	207,600,000
Dec-22	184,092,800.00	-	-	30,427,200.00	214,520,000
Jan-23	166,727,900.00	-	-	47,792,100.00	214,520,000
Feb-23	161,123,780.00	106,251.17	150,639.37	32,379,329.46	193,760,000
Mar-23	162,366,200.00	14,285,584.44	1,455,129.62	36,413,085.94	214,520,000
Apr-23	140,097,280.00	2,225,540.00	1,446,090.00	63,831,090.00	207,600,000
May-23	129,612,630.00	3,920,440.00	847,350.00	80,139,580.00	214,520,000
Jun-23	117,106,040.00	1,420,090.00	5,208,570.00	83,865,300.00	207,600,000
TOTAL	1,920,020,350	27,663,671	11,500,334	566,615,644	2,525,800,000



Table 9-3: Average Monthly Energy Profile of Kaduna Disco: July 2022 to June 2023

Month	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	206.01	1.41	0.89	80.02	288.33
Aug-22	236.19	3.28	0.68	48.18	288.33
Sep-22	235.86	3.08	1.70	47.70	288.33
Oct-22	244.94	-	-	43.39	288.33
Nov-22	247.00	-	-	41.34	288.33
Dec-22	247.44	-	-	40.90	288.33
Jan-23	224.10	-	-	64.24	288.33
Feb-23	239.77	0.16	0.22	48.18	288.33
Mar-23	218.23	19.20	1.96	48.94	288.33
Apr-23	194.58	3.09	2.01	88.65	288.33
May-23	174.21	5.27	1.14	107.71	288.33
Jun-23	162.65	1.97	7.23	116.48	288.33
TOTAL	219.18	3.16	1.31	64.68	288.33

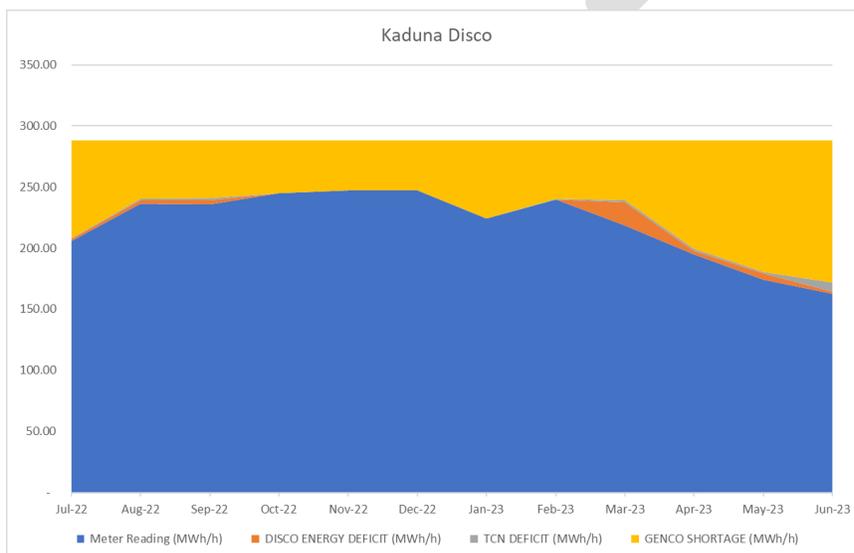


Figure 9-1: Energy Consumption and Deficits for Kaduna Disco July 2023 to June 2023.

During the specified period, Kaduna Disco experienced a generation shortage, resulting in 22.43% (64.68 MWh/h) of its required energy not being met. It is crucial for Kaduna Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Kaduna Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Kaduna Disco to ensure adequate procurement of generation capacity to optimize the desired expanded transmission capacity.

### Outage Issues

The average level of feeder outages caused by Kaduna Disco and TCN are given in Table 9-4. From the table, TCN recognizes high downtime level at the Kaduna Town, Mando and Sokoto



substations. To address these issues, TCN will prioritize the resolution of maintenance-related challenges in these substations.

Table 9-4: Kaduna Disco's Outage Breakdown by Entity: January 2023 to June 2023

TCN STATION	ACTUAL (MWh)	FORECAST (MWh)	DISCO -VE (MWh)	DISCO +VE (MWh)	TCN -VE (MWh)
Kaduna Town 132kV	44.99	66.38	(20.88)	6.60	(1.65)
Mando 132kV	56.90	73.13	(23.21)	12.90	(1.32)
Sokoto 132kV	22.17	40.42	(25.09)	8.37	(1.16)
Zaria 132kV	23.42	37.09	(15.69)	4.97	(0.65)
Birnin-Kebbi 132kV	22.95	32.73	(17.60)	10.78	(0.64)
Gusau 132kV	11.65	18.34	(7.83)	2.26	(0.59)
Talata-Mafara 132kV	3.70	5.74	(3.40)	1.77	(0.13)
Yauri 132kV	4.06	5.14	(2.84)	2.20	(0.07)
Kafanchan 132kV	3.39	7.15	(3.88)	0.21	(0.01)
Tegina 132kV	1.41	0.63	(0.26)	1.10	(0.01)
<b>Total</b>	<b>194.64</b>	<b>286.75</b>	<b>(120.67)</b>	<b>51.16</b>	<b>(6.24)</b>



### 10.1 Meeting with Kano Disco

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#### **Purpose of Meeting**

On February 1, 2023, the TCN PIP Committee held a meeting with Kano Distribution Company (KEDC) at the PWC Experience Centre. The primary purpose of the consultation meeting was to foster engagement between TCN and KEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>9</sup> within the Kano Distribution Company (KEDC) franchise area and told the KEDC team to review and prioritize these projects based on KEDC specific demands and priorities. TCN highlighted that the KEDC team's input is crucial in determining the priority and justification for each project.

TCN also informed KEDC that certain projects, such as those under the Service Level Agreement (SLA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that KEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

#### **Project Selection Justification**

TCN suggested that KEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: KEDC should outline the specific objectives of each selected project. For example, KEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network

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<sup>9</sup> Please see volume 1 for the list of projects



expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.

2. Justification for the Project: KEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. KEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.

3. Timeline for the Project: KEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, KEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and KEDC, ensuring that the projects are aligned with KEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to KEDC**

KEDCO expressed that it appears several projects are addressing their needs. They noted that the SLA Wudil substation project has been awarded, although it has not yet commenced. Once completed, this project can be utilized to backfeed Kano and alleviate the load on Dakata substation.

Regarding the WB/NETAP additional 300MVA to Kumbotso substation, KEDCO pointed out that additional line bays would be required to accommodate the increased capacity. They also highlighted the challenge of transformer capacity limitation at the Tamburawa substation, which has not been addressed by any existing project.

Furthermore, KEDCO raised concerns about the low voltage profile experienced by several substations in their franchise area. They suggested that refurbishing capacitor banks at various TCN substations could help improve power quality, addressing the current power quality issues faced by KEDCO.

KEDCO's observations bring attention to specific projects and challenges that require consideration in order to enhance power supply and address power quality issues within their franchise area.

The concerns expressed by KEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with KEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient project implementation, TCN and KEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the KEDC franchise area.



TCN responded by suggesting that, from the list of project requests, the completion of the FGN Walalembé project can provide temporary relief to Dakata in the short term, serving as an interim solution before implementing a long-term plan.

Regarding the refurbishment of capacitor banks, TCN proposed that proper studies be conducted to determine the optimal placement and sizing of the capacitor banks. This approach ensures that the refurbishment is strategically planned and executed for maximum effectiveness.

By providing these suggestions, TCN acknowledges the project requests and offers potential solutions to address the immediate needs highlighted by KEDCO. It demonstrates TCN's commitment to finding practical and efficient ways to improve power supply and address power quality issues within the KEDCO franchise area.

TCN expressed its optimism that the ongoing consultations and alignment efforts will yield positive results for the industry. TCN that the Nigerian Electricity Regulatory Commission (NERC) is dedicated to resolving the financing challenges by ensuring that the industry bears the cost of its projects, which will be integrated into the tariff structure. TCN appreciated the collaboration from all participants and urged them to continue working together to achieve full alignment of projects between TCN and KEDCO.

#### **Meeting Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and KEDCO can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the KEDCO franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.

TCN and KEDCO will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the KEDCO franchise area.

## **10.2 Kano Disco's Load Forecast**

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### **Load Forecast**

KEDCO submitted the load forecast given in [Table 10-1](#) for planning purposes.



Table 10-1: Kano Disco Forecast for Year 2024 to 2028

#	TCN STATION	2024		2025		2026		2027		2028	
		Max (MW)	Ave (MW)								
1	Funtua 132kV	26.00	7.00	27.30	7.35	28.67	7.72	30.10	8.10	31.60	8.51
2	Dakata 132kV	60.00	40.00	63.00	42.00	66.15	44.10	69.46	46.31	72.93	48.62
3	Dan-Agundi 132kV	80.00	45.00	84.00	47.25	88.20	49.61	92.61	52.09	97.24	54.70
4	Daura 132kV	34.11	8.33	35.82	8.75	37.61	9.19	39.49	9.65	41.47	10.13
5	Dutse 132kV	32.08	9.72	33.68	10.20	35.37	10.71	37.13	11.25	38.99	11.81
6	Hadejia 132kV	39.90	6.11	41.90	6.41	43.99	6.73	46.19	7.07	48.50	7.42
7	Kankia 132kV	23.39	8.44	24.56	8.86	25.79	9.31	27.08	9.77	28.44	10.26
8	Katsina 132kV	49.35	25.70	51.82	26.98	54.41	28.33	57.13	29.75	59.99	31.23
9	Kumbotso 132kV	70.00	30.00	73.50	31.50	77.18	33.08	81.03	34.73	85.09	36.47
10	Kwanar-Dangora 132kV	16.80	6.32	17.64	6.63	18.52	6.97	19.45	7.31	20.42	7.68
11	Tamburawa 132kV	34.00	20.00	35.70	21.00	37.49	22.05	39.36	23.15	41.33	24.31
12	Wudil 132kV	17.71	5.13	18.60	5.38	19.53	5.65	20.51	5.94	21.53	6.23
13	Gagarawa 132kV	13.33	2.97	14.00	3.11	14.70	3.27	15.44	3.43	16.21	3.60
14	Bichi 132kV	4.12	0.75	4.32	0.79	4.54	0.83	4.76	0.87	5.00	0.91
TOTAL		500.80	215.46	525.84	226.23	552.13	237.54	579.74	249.42	608.73	261.89

**Analysis of recent Discos Consumption**

Table 10-2 gives the monthly energy consumption and deficit amounts of Kano Disco from July 2022 to June 2023. Table 10-3 gives the monthly average of the figures in Table 10-2 in MWh/h. During the period of July 2022 to June 2023, Kano Disco was projected to receive an average of 300.00 MWh/h of electricity from the grid. However, it only received 223.26 MWh/h, which accounts for approximately 74.42% of the required energy. There was an average generation shortage of 71.82 MWh/h. TCN outages were responsible for 1.27 MWh/h and those of Kano Disco was responsible for 3.65 MWh/h. This information is depicted in graphical form in Figure 10-1.

Table 10-2: Monthly Energy Profile of Kano Disco: July 2022 to June 2023

Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)
Jul-22	149,664,220.00	5,623,845.16	979,816.48	66,932,118.36	223,200,000
Aug-22	167,404,480.00	10,915,696.36	559,930.68	44,319,892.97	223,200,000
Sep-22	156,724,460.00	9,197,867.58	3,929,413.46	46,148,258.97	216,000,000
Oct-22	180,368,490.00	-	-	42,831,510.00	223,200,000
Nov-22	179,871,110.00	-	-	36,128,890.00	216,000,000
Dec-22	182,872,580.00	2,568,077.71	799,803.33	36,959,538.96	223,200,000
Jan-23	168,497,750.00	-	-	54,702,250.00	223,200,000
Feb-23	160,572,030.00	1,758,819.07	829,745.77	38,439,405.16	201,600,000
Mar-23	185,593,300.00	-	462,847.32	37,143,852.68	223,200,000
Apr-23	150,493,980.00	-	-	65,506,070.00	216,000,050
May-23	151,257,880.00	435,570.00	969,660.00	70,536,890.00	223,200,000
Jun-23	122,425,300.00	1,481,580.00	2,563,080.00	89,530,040.00	216,000,000
TOTAL	1,955,745,580	31,981,456	11,094,297	629,178,717	2,628,000,050



Table 10-3: Average Monthly Energy Profile of Kano Disco: July 2022 to June 2023

Month	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	201.16	7.56	1.32	89.96	300.00
Aug-22	225.01	14.67	0.75	59.57	300.00
Sep-22	217.67	12.77	5.46	64.09	300.00
Oct-22	242.43	-	-	57.57	300.00
Nov-22	249.82	-	-	50.18	300.00
Dec-22	245.80	3.45	1.08	49.68	300.00
Jan-23	226.48	-	-	73.52	300.00
Feb-23	238.95	2.62	1.23	57.20	300.00
Mar-23	249.45	-	0.62	49.92	300.00
Apr-23	209.02	-	-	90.98	300.00
May-23	203.30	0.59	1.30	94.81	300.00
Jun-23	170.04	2.06	3.56	124.35	300.00
TOTAL	223.26	3.65	1.27	71.82	300.00

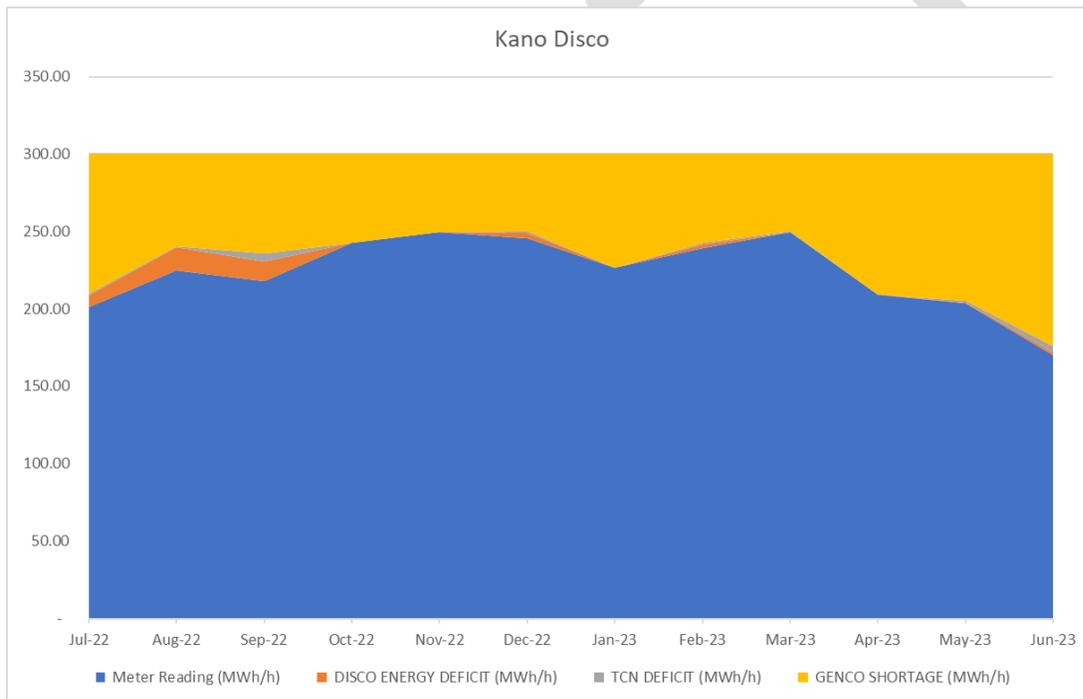


Figure 10-1: Energy Consumption and Deficits for Kano Disco July 2023 to June 2023.

During the specified period, Kano Disco experienced a generation shortage, resulting in 23.94% (71.82 MWh/h) of its required energy not being met. It is crucial for Kano Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Kano Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Kano Disco to ensure adequate procurement of generation capacity to optimize the desired expanded transmission capacity.



## Outage Issues

The average level of feeder outages caused by Kano Disco and TCN are given in Table 3-4.

Table 10-4: Kano Disco's Outage Breakdown by Entity: January 2023 to June 2023

TCN STATION	ACTUAL (MWh)	FORECAST (MWh)	DISCO -VE (MWh)	DISCO +VE (MWh)	TCN -VE (MWh)
Dan-Agundi 132kV	43.07	65.81	(18.52)	4.44	(2.49)
Dakata 132kV	45.28	58.42	(13.59)	6.59	(2.13)
Tamburawa 132kV	19.67	36.26	(13.23)	2.04	(1.90)
Kumbotso 132kV	35.28	49.39	(13.91)	4.78	(1.68)
Katsina 132kV	21.79	23.80	(4.69)	4.53	(0.77)
Dutse 132kV	7.82	13.47	(4.11)	1.29	(0.72)
Daura 132kV	6.49	11.33	(4.50)	1.36	(0.54)
Kankia 132kV	6.15	9.23	(2.87)	1.87	(0.44)
Hadejia 132kV	5.17	8.18	(3.07)	0.75	(0.41)
Funtua 132kV	11.25	18.00	(7.24)	1.99	(0.32)
Wudil 132kV	4.78	4.17	(1.27)	2.49	(0.23)
Gagarawa 132kV	2.41	3.72	(1.08)	0.27	(0.21)
Kwanar-Dangora 132kV	4.96	6.61	(2.22)	1.43	(0.17)
Bichi 132kV	0.58	0.51	(0.08)	0.19	(0.03)
Total	214.70	308.90	(90.37)	34.02	(12.04)

## 11 PORTHARCOURT DISCO

### 11.1 Meeting with Port-Harcourt Disco

#### Purpose of Meeting

On February 1, 2023, the TCN PIP Committee held a meeting with Port-Harcourt Distribution Company (PHEDC) at the PWC Experience Centre. The primary purpose of the consultation meeting was to foster engagement between TCN and PHEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>10</sup> within the Port-Harcourt Distribution Company (PHEDC) franchise area and told the PHEDC team to review and prioritize these projects based on PHEDC specific demands and priorities. TCN highlighted that the PHEDC team's input is crucial in determining the priority and justification for each project.

<sup>10</sup> Please see volume 1 for the list of projects



TCN also informed PHEDC that certain projects, such as those under the Service Level Agreement (SLA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that PHEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

### **Project Selection Justification**

TCN suggested that PHEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: PHEDC should outline the specific objectives of each selected project. For example, PHEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.
2. Justification for the Project: PHEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. PHEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.
3. Timeline for the Project: PHEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, PHEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and PHEDC, ensuring that the projects are aligned with PHEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to PHEDC**

PHEDC expressed gratitude to TCN for the consultation meeting and recognized the efforts being made to address the challenges through ongoing TCN projects. Both parties agreed to align the identified challenges with the relevant TCN projects and prioritize them accordingly.



One specific challenge highlighted by PHEDC is the ATC&C (Aggregate Technical, Commercial, and Collection) losses experienced in Ikom and its environs, primarily due to the long-distance 33kV line from Abakaliki. PHEDC appreciated the proposed FGN/IGR (Federal Government of Nigeria/Internal Generated Revenue) project put forth by TCN in response to their request, indicating that it addresses this specific challenge.

Additionally, PHEDC urged TCN to promptly resolve the ownership issue related to the Rumuosi 132kV substation. This resolution is essential to prevent any potential delays or disruptions to the ongoing SLA project being carried out at the station.

By highlighting these issues, PHEDC aims to ensure that the identified challenges are properly addressed, and necessary actions are taken to overcome them effectively. Their input emphasizes the need for collaboration and timely resolution to foster the smooth implementation of projects and improve service delivery in the respective areas.

The concerns expressed by PHEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with PHEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient project implementation, TCN and PHEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the PHEDC franchise area.

TCN expressed its optimism that the ongoing consultations and alignment efforts will yield positive results for the industry. TCN that the Nigerian Electricity Regulatory Commission (NERC) is dedicated to resolving the financing challenges by ensuring that the industry bears the cost of its projects, which will be integrated into the tariff structure. TCN appreciated the collaboration from all participants and urged them to continue working together to achieve full alignment of projects between TCN and PHEDC.

#### **Meeting Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and PHEDC can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the PHEDC franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.

TCN and PHEDC will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the PHEDC franchise area.



## 11.2 Port-Harcourt Disco's Load Forecast

### Load Forecast

EEDC submitted the load forecast given in [Table 3-1](#) for planning purposes.

Table 11-1: Port-Harcourt Disco Forecast for Year 2024 to 2028

#	TCN STATION	2024		2025		2026		2027		2028	
		Max (MW)	Ave (MW)								
1	Agu Awka 132kV	53.6	43.4	58.8	47.6	64.7	52.4	71.3	57.8	78.8	63.8
2	GCM 132kV	52.2	41.8	53.2	42.6	54.3	43.4	55.5	44.4	56.7	45.4
3	Nibo Awka 132kV	70.6	55.8	74.8	59.1	79.4	62.7	84.3	66.6	89.7	70.9
4	Oji River 132kV	28.6	21.5	29.3	22.0	30.1	22.6	30.9	23.2	31.8	23.9
5	Onitsha 132kV	234.9	173.8	246.5	182.4	259.3	191.6	273.5	202.4	289.1	213.9
6	Abakaliki 132kV	73.6	59.6	74.4	60.3	75.3	61.0	74.3	60.2	77.5	62.8
7	New-Haven 132kV	178	144.2	181.8	147.3	186	150.7	190.4	154.2	195.1	158.0
8	Nkalagu 132kV	14.2	9.5	13.8	9.2	13.4	9.0	13.1	8.8	12.7	8.5
9	Ugwuaji 132kV	29.1	22.4	29.1	22.4	29.1	22.4	29	22.3	29	22.3
10	UNN Nsukka 132kV	39.4	31.5	41	32.8	42.7	34.2	44.4	35.5	46.3	37.0
11	Umuahia 132kV	92.6	70.4	96.2	73.1	100.2	76.2	104.6	79.5	109	82.8
12	Itu 132kV	9.4	8.4	9.3	8.3	9.1	8.1	9	8.0	8.9	7.9
13	Owerri 132kV	250.9	175.6	269.6	188.7	290.9	203.6	315	220.5	342.5	239.8
	<b>Total</b>	<b>1127.1</b>	<b>857.9</b>	<b>1177.8</b>	<b>895.8</b>	<b>1234.5</b>	<b>937.9</b>	<b>1295.3</b>	<b>983.4</b>	<b>1367.1</b>	<b>1037.0</b>

### Analysis of recent Discos Consumption

[Table 11-2](#) gives the monthly energy consumption and deficit amounts of Port-Harcourt Disco from July 2022 to June 2023. [Table 11-3](#) gives the monthly average of the figures in [Table 11-2](#) in MWh/h. During the period of July 2022 to June 2023, Port-Harcourt Disco was projected to receive an average of 315.67 MWh/h of electricity from the grid. However, it only received 244.30 MWh/h, which accounts for approximately 77.39% of the required energy. There was an average generation shortage of 54.99 MWh/h. TCN outages were responsible for 3.85 MWh/h and those of Port-Harcourt Disco was responsible for 12.53 MWh/h. This information is depicted in graphical form in [Figure 11-1](#).



Table 11-2: Monthly Energy Profile of Port-Harcourt Disco: July 2022 to June 2023

Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)
Jul-22	176,141,410.00	5,813,639.90	232,287.94	52,668,662.16	234,856,000
Aug-22	174,668,360.00	15,145,465.40	1,466,891.27	43,575,283.33	234,856,000
Sep-22	170,693,320.00	17,453,782.48	798,495.09	38,334,402.42	227,280,000
Oct-22	171,833,050.00	7,933,737.19	7,427,677.46	47,661,535.34	234,856,000
Nov-22	176,145,130.00	8,968,630.37	2,592,469.46	39,573,770.17	227,280,000
Dec-22	195,583,700.00	7,665,699.12	1,951,437.00	29,655,163.88	234,856,000
Jan-23	180,211,100.00	1,387,382.42	1,680,780.31	51,576,737.27	234,856,000
Feb-23	187,029,300.00	1,826,193.51	2,934,620.32	20,337,886.17	212,128,000
Mar-23	177,654,530.00	22,770,239.25	1,911,743.04	32,519,487.70	234,856,000
Apr-23	173,227,400.00	8,593,350.00	1,491,780.00	43,967,470.00	227,280,000
May-23	187,010,940.00	8,479,060.00	3,563,460.00	35,802,540.00	234,856,000
Jun-23	169,855,960.00	3,715,990.00	7,701,890.00	46,006,160.00	227,280,000
TOTAL	2,140,054,200	109,753,170	33,753,532	481,679,098	2,765,240,000

Table 11-3: Average Monthly Energy Profile of Port-Harcourt Disco: July 2022 to June 2023

Month	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	236.75	7.81	0.31	70.79	315.67
Aug-22	234.77	20.36	1.97	58.57	315.67
Sep-22	237.07	24.24	1.11	53.24	315.67
Oct-22	230.96	10.66	9.98	64.06	315.67
Nov-22	244.65	12.46	3.60	54.96	315.67
Dec-22	262.88	10.30	2.62	39.86	315.67
Jan-23	242.22	1.86	2.26	69.32	315.67
Feb-23	278.32	2.72	4.37	30.26	315.67
Mar-23	238.78	30.61	2.57	43.71	315.67
Apr-23	240.59	11.94	2.07	61.07	315.67
May-23	251.36	11.40	4.79	48.12	315.67
Jun-23	235.91	5.16	10.70	63.90	315.67
TOTAL	244.30	12.53	3.85	54.99	315.67



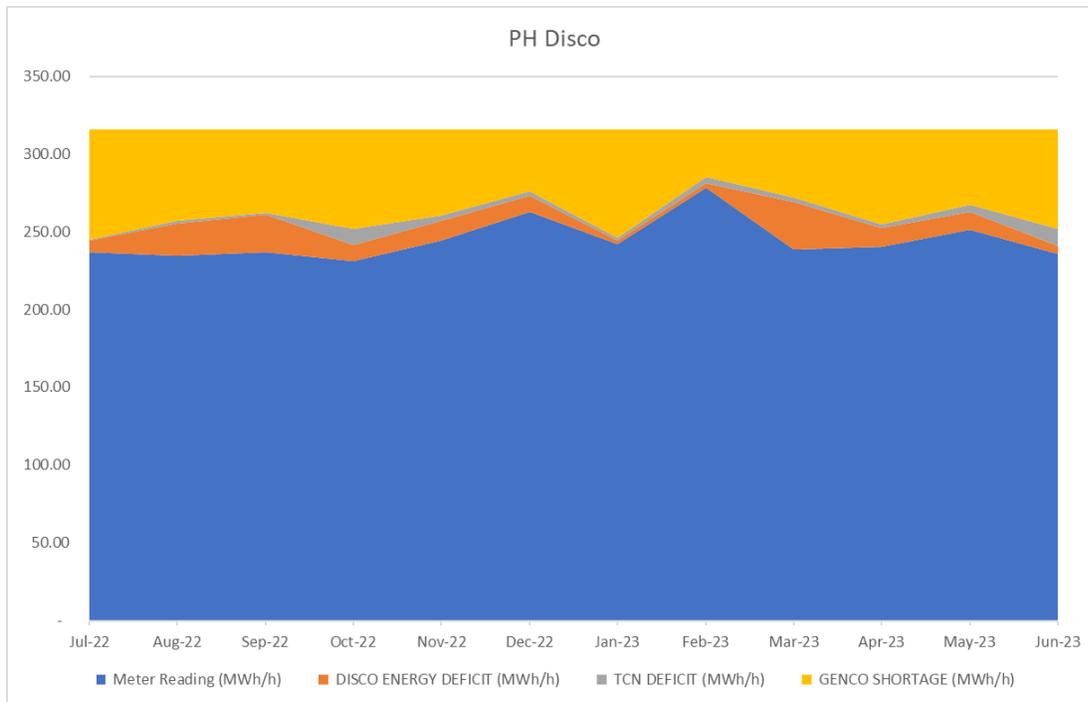


Figure 11-1: Energy Consumption and Deficits for Port-Harcourt Disco July 2023 to June 2023.

During the specified period, Port-Harcourt Disco experienced a generation shortage, resulting in 17.42% (54.99 MWh/h) of its required energy not being met. It is crucial for Port-Harcourt Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Port-Harcourt Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Port-Harcourt Disco to ensure adequate procurement of generation capacity to optimize the desired expanded transmission capacity.

**Outage Issues**

The average level of feeder outages caused by Port-Harcourt Disco and TCN are given in [Table 11-4](#).



Table 11-4: Port-Harcourt Disco's Outage Breakdown by Entity: January 2023 to June 2023

TCN STATION	ACTUAL (MWh)	FORECAST (MWh)	DISCO -VE (MWh)	DISCO +VE (MWh)	TCN -VE (MWh)
New-Haven 132kV Total	52.89	58.93	(7.78)	12.54	(4.66)
Owerri 132kV Total	40.87	47.46	(12.69)	11.48	(2.60)
Abakaliki 132kV Total	14.00	20.98	(10.82)	5.15	(0.81)
Nibo Awka 132kV Total	20.26	27.40	(8.95)	3.30	(0.74)
Umuahia 132kV Total	19.08	23.02	(7.09)	4.24	(0.45)
Agu Awka 132kV Total	19.84	23.04	(6.03)	3.31	(0.43)
Onitsha 132kV Total	59.57	75.75	(26.19)	13.62	(0.37)
Oji River 132kV Total	2.78	5.99	(3.49)	0.71	(0.27)
UNN Nsukka 132kV Total	11.46	10.92	(1.98)	2.64	(0.09)
GCM 132kV Total	18.52	15.63	(2.00)	5.33	(0.06)
Ugwuaji 132kV Total	12.27	11.46	(2.02)	2.84	(0.02)
Nkalagu 132kV Total	1.35	1.81	(0.90)	0.46	(0.01)
Itu 132kV Total	0.85	1.25	(0.77)	0.38	(0.01)
<b>Grand Total</b>	<b>273.75</b>	<b>323.64</b>	<b>(90.71)</b>	<b>66.00</b>	<b>(10.53)</b>



### 12.1 Meeting with Yola Disco

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#### **Purpose of Meeting**

On February 1, 2023, the TCN PIP Committee held a meeting with Yola Distribution Company (YEDC) at the PWC Experience Centre. The primary purpose of the consultation meeting was to foster engagement between TCN and YEDC regarding the preparation of the TCN PIP. The aim was to align investments and timelines with the Disco's PIP, ensuring a cohesive approach to project implementation.

During the meeting, TCN emphasized that the TCN PIP is a comprehensive 5-year program designed to synchronize the objectives and timing of various projects with the priorities of the Discos. The goal was to achieve convergence in project delivery, allowing for greater coordination and efficiency in meeting the overall objectives of the electricity supply industry.

TCN presented the ongoing TCN projects<sup>11</sup> within the Yola Distribution Company (YEDC) franchise area and told the YEDC team to review and prioritize these projects based on YEDC specific demands and priorities. TCN highlighted that the YEDC team's input is crucial in determining the priority and justification for each project.

TCN also informed YEDC that certain projects, such as those under the Service Level Agreement (SLA), Presidential Power Initiative (PPI), and World Bank/Nigeria Electricity Transmission Access Project (WB/NETAP), are already in progress at various stages of completion and have adequate funding. While the Federal Government of Nigeria (FGN)/Internally Generated Revenue (IGR) projects are the ones to be funded by TCN through revenues received from the Discos. Based on this TCN stated that YEDC should focus their efforts on prioritization on the FGN/IGR projects

TCN made it clear that the categorization of projects as SLA, WB/NETAP, or FGN/IGR should not restrict the DISCOs from expressing their desired priorities based on their specific needs. The intention was to allow flexibility in determining the project priority, regardless of its classification.

#### **Project Selection Justification**

TCN suggested that YEDC provide specific information for the projects selected in its priority list. The requested details include:

1. Objectives of the Project: YEDC should outline the specific objectives of each selected project. For example, YEDC should clarify whether the project aims to reduce Aggregate Technical, Commercial, and Collection (ATC&C) losses, increase revenue, or facilitate network expansion. Defining the project objectives helps establish a clear understanding of the intended outcomes and aligns them with the broader goals of TCN.

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<sup>11</sup> Please see volume 1 for the list of projects



2. Justification for the Project: YEDC is encouraged to provide a comprehensive justification for each selected project. This justification should demonstrate the need for implementing the project by presenting evidence of available demand that necessitates its implementation. YEDC should highlight the specific customer requirements, load patterns, or any other pertinent factors that support the project's importance and its ability to address the identified demand.

3. Timeline for the Project: YEDC should specify the expected timeline for each selected project. This includes indicating whether the project is required to be completed in the current year, such as 2023 (year one), or in subsequent years, such as year two and beyond. Establishing a timeline for the projects assists in resource planning, scheduling, and overall project management.

By providing this information, YEDC will enable TCN to gain a comprehensive understanding of the selected projects, their objectives, the underlying demand, and the required timeline for implementation. This facilitates effective coordination between TCN and YEDC, ensuring that the projects are aligned with YEDC's specific needs and contribute to the overall improvement of service delivery within its franchise area.

### **Issues Relevant to YEDC**

YEDC expressed appreciation to TCN for the positive and collaborative relationship established thus far, particularly in terms of outage management. They also commended TCN for the initiative to engage with YEDC in the development of the TCN PIP (Project Implementation Plan), expressing optimism that the discussions have been fruitful and will lead to the necessary alignment for improved service delivery.

YEDC further observed that most of their project requests are currently being addressed by various ongoing projects, which is a positive development. However, they highlighted the upgrading of the 15MVA to 60MVA at Baga Road substation, which has not been included in any existing project. YEDC emphasized the value that this upgrading would add to their operations, as they are currently implementing extensive network reinforcements in the area to accommodate the additional capacity from the MEPP (Mambilla Hydroelectric Power Project).

In addition, YEDC noted the proximity of the Jada and Ganye substations to the Mayo Belwa substation, which is undergoing an upgrade to 330kV status with an additional 60MVA capacity. In light of this upgrade, YEDC plans to radiate 33kV feeders from Mayo Belwa to supply power to Ganye and Jada.

YEDC further emphasized the need to reconstruct a 132kV bay at Gombe in order to restore the functionality of the Gombe-Yola 132kV line. This restoration is crucial as it would provide redundancy and the capability to backfeed power to Yola in case of any disruptions or outages.

YEDC's observations and requests highlight their specific needs and potential areas for improvement in service delivery. Their input contributes to the ongoing collaboration between



YEDC and TCN to ensure effective project planning and implementation that addresses the energy requirements of the respective areas served by YEDC.

The concerns expressed by YEDC highlight the importance of effective project management and timely execution. TCN acknowledges these concerns and will work closely with YEDC to address the challenges and expedite the progress of the projects. By prioritizing efficient project implementation, TCN and YEDC can collaborate to enhance the electricity supply services, improve customer satisfaction, and drive economic growth within the YEDC franchise area.

TCN responded by assuring YEDC that efforts are underway to reconstruct the 132kV line bay at Gombe to enable the backfeeding of power to Yola. TCN expressed its commitment to delivering on this project as soon as possible, recognizing the significance of establishing a reliable power supply to Yola. Furthermore, TCN acknowledged the critical need for a second source of power supply to the northeast region in order to enhance network security. In light of this, TCN affirmed that due consideration will be given to establishing another power source through the Makurdi-Jalingo-Yola-Maiduguri route. This consideration aligns with the ongoing upgrade of the Jalingo substation to 330kV, which is expected to be completed within the year 2023.

By providing this response, TCN reaffirms its dedication to addressing the power supply requirements of Yola and the entire northeast region. The focus on reconstructing the Gombe 132kV line bay and exploring additional power sources demonstrates TCN's commitment to network reliability, security, and the overall development of the power infrastructure in the area.

TCN expressed its optimism that the ongoing consultations and alignment efforts will yield positive results for the industry. TCN that the Nigerian Electricity Regulatory Commission (NERC) is dedicated to resolving the financing challenges by ensuring that the industry bears the cost of its projects, which will be integrated into the tariff structure. TCN appreciated the collaboration from all participants and urged them to continue working together to achieve full alignment of projects between TCN and YEDC.

### **Meeting Conclusion**

TCN expressed appreciation to all participants for the understanding reached during the discussions. Recognizing the importance of collaboration, TCN emphasized the need to maintain this collaborative spirit moving forward. By aligning projects and coordinating strategies, TCN and YEDC can leverage their combined expertise and resources to deliver efficient, reliable, and sustainable electricity services to the consumers within the YEDC franchise area.

The collaborative approach fosters mutual understanding, trust, and cooperation among all participants. It allows for effective coordination, information sharing, and joint decision-making, leading to the successful implementation of projects and the improvement of service delivery to customers.



TCN and YEDC will continue to foster an environment of cooperation and joint efforts to ensure the overall success and sustainable development of the electricity supply industry within the YEDC franchise area.

## 12.2 Yola Disco's Load Forecast

### Load Forecast

EEDC submitted the load forecast given in [Table 12-1](#) for planning purposes.

Table 12-1: Yola Disco Forecast for Year 2024 to 2028

#	TCN STATION	2024		2025		2026		2027		2028	
		Max (MW)	Ave (MW)								
1	Biu 132kV	28.08	13.92	30.33	15.03	32.75	16.23	35.37	17.53	38.20	18.93
2	Potiskum 132kV	36.81	16.40	40.12	17.22	43.73	18.08	47.66	18.98	51.95	19.93
3	Damaturu 132kV	23.97	15.02	24.93	15.32	25.93	15.63	26.97	15.94	28.04	16.26
4	Damboa 132kV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	Maiduguri 132kV	15.45	18.04	15.91	23.46	16.39	30.49	16.88	39.64	17.39	51.53
6	Molai 132kV	12.30	9.63	14.76	12.51	17.71	16.27	21.25	21.15	25.51	27.49
7	Jalingo 132kV	27.64	16.27	28.47	17.08	29.32	17.94	30.20	18.83	31.11	19.78
8	Mayo-Belwa 132kV	20.29	7.28	22.73	7.35	25.45	7.43	28.51	7.50	31.93	7.58
9	Savannah 132kV	16.26	3.78	22.77	4.05	31.88	4.33	44.63	4.64	62.48	4.96
10	Yola 132kV	57.94	35.46	59.68	36.17	61.47	36.90	63.31	37.64	65.21	38.39
11	Takum 132kV	9.02	2.37	11.73	2.49	15.25	2.61	19.82	2.74	25.77	2.88
12	Wukari 132kV	4.73	1.07	6.62	1.12	9.27	1.18	12.98	1.24	18.18	1.30
	TOTAL	252.49	139.24	278.04	151.80	309.15	167.08	347.59	185.83	395.76	209.03

### Analysis of recent Discos Consumption

[Table 12-2](#) gives the monthly energy consumption and deficit amounts of Yola Disco from July 2022 to June 2023. [Table 12-3](#) gives the monthly average of the figures in [Table 10-3](#) in MWh/h. During the period of July 2022 to June 2023, Yola Disco was projected to receive an average of 126.00 MWh/h of electricity from the grid. However, it only received 99.34 MWh/h, which accounts for approximately 78.84% of the required energy. There was an average generation shortage of 19.91MWh/h. TCN outages were responsible for 1.87 MWh/h and those of Yola Disco was responsible for 4.88 MWh/h. This information is depicted in graphical form in [Figure 12-1](#).



Table 12-2: Monthly Energy Profile of Yola Disco: July 2022 to June 2023

Month	Meter Reading (KWh)	DISCO ENERGY DEFICIT (KWh)	TCN DEFICIT (KWh)	GENCO SHORTAGE (KWh)	Total (KWh)
Jul-22	64,875,900	3,786,047	1,260,582	23,821,471	93,744,000
Aug-22	64,865,600	8,827,393	1,435,097	18,615,910	93,744,000
Sep-22	64,420,300	8,849,847	1,532,930	15,916,923	90,720,000
Oct-22	71,873,700	3,222,190	1,897,180	16,750,930	93,744,000
Nov-22	73,645,600	3,197,663	1,874,120	12,002,617	90,720,000
Dec-22	76,975,300	4,937,161	2,293,790	9,537,749	93,744,000
Jan-23	73,997,900	1,732,180	2,321,070	15,692,850	93,744,000
Feb-23	71,560,300	1,226,066	3,572,830	8,312,804	84,672,000
Mar-23	97,317,600	-	(3,573,600)	-	93,744,000
Apr-23	76,510,400	660,760	1,604,900	11,943,940	90,720,000
May-23	73,999,320	4,560,000	744,160	14,440,520	93,744,000
Jun-23	60,158,840	1,743,200	1,450,210	27,367,750	90,720,000
TOTAL	870,200,760	42,742,507	16,413,269	174,403,464	1,103,760,000

Table 12-3: Average Monthly Energy Profile of Yola Disco: July 2022 to June 2023

Month	Meter Reading (MWh/h)	DISCO ENERGY DEFICIT (MWh/h)	TCN DEFICIT (MWh/h)	GENCO SHORTAGE (MWh/h)	Total (MWh/h)
Jul-22	87.20	5.09	1.69	32.02	126.00
Aug-22	87.18	11.86	1.93	25.02	126.00
Sep-22	89.47	12.29	2.13	22.11	126.00
Oct-22	96.60	4.33	2.55	22.51	126.00
Nov-22	102.29	4.44	2.60	16.67	126.00
Dec-22	103.46	6.64	3.08	12.82	126.00
Jan-23	99.46	2.33	3.12	21.09	126.00
Feb-23	106.49	1.82	5.32	12.37	126.00
Mar-23	130.80	-	(4.80)	-	126.00
Apr-23	106.26	0.92	2.23	16.59	126.00
May-23	99.46	6.13	1.00	19.41	126.00
Jun-23	83.55	2.42	2.01	38.01	126.00
TOTAL	99.34	4.88	1.87	19.91	126.00



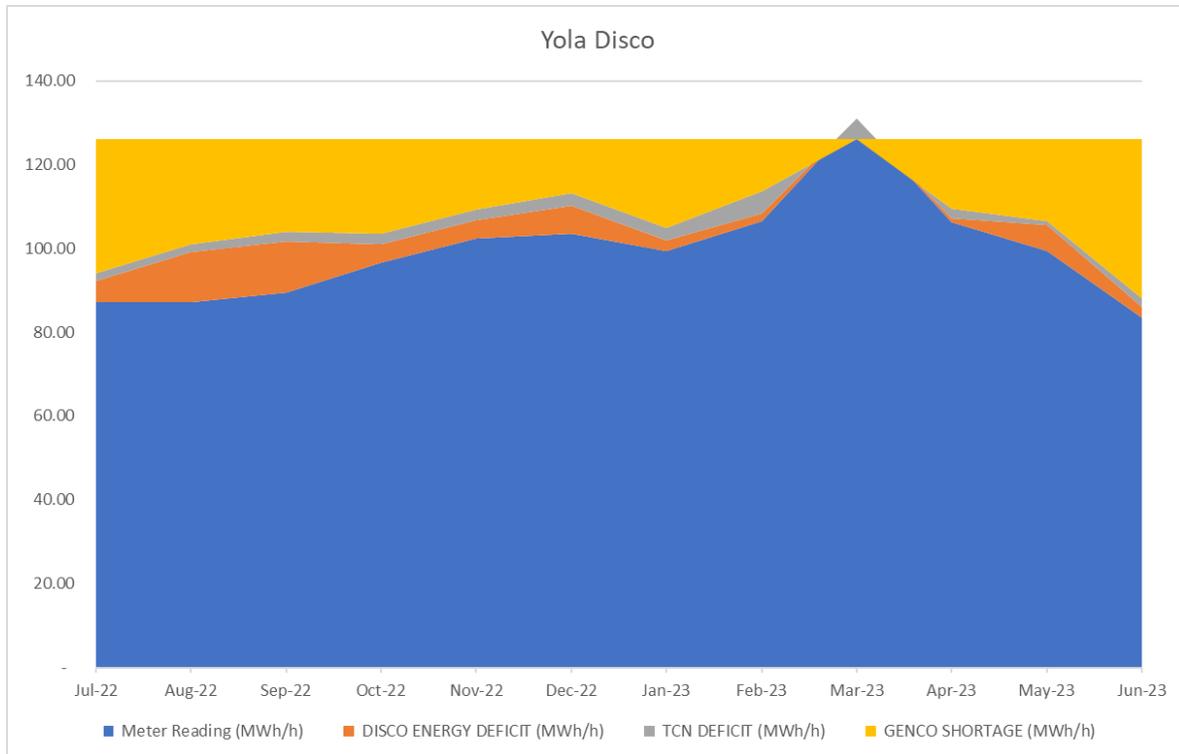


Figure 12-1: Energy Consumption and Deficits for Yola Disco July 2023 to June 2023.

During the specified period, Yola Disco experienced a generation shortage, resulting in 15.80% (19.91 MWh/h) of its required energy not being met. It is crucial for Yola Disco to take responsibility for procuring sufficient generation capacity to meet its needs. It would be wasteful if TCN undertakes expansionary work while Yola Disco lacks the necessary generation capacity to fully utilize the increased capacity. Therefore, it is essential for Yola Disco to ensure adequate procurement of generation capacity to optimize the desired expanded transmission capacity.

**Outage Issues**

The average level of feeder outages caused by Yola Disco and TCN are given in Table 3-4.



Table 12-4: Yola Disco's Outage Breakdown by Entity: January 2023 to June 2023

TCN STATION	ACTUAL (MWh)	FORECAST (MWh)	DISCO -VE (MWh)	DISCO +VE (MWh)	TCN -VE (MWh)
Yola 132kV	29.96	31.96	(6.83)	6.18	(0.18)
Jalingo 132kV	10.77	12.72	(3.18)	2.91	(0.07)
Mayo-Belwa 132kV	5.99	7.19	(2.01)	0.99	(0.05)
Potiskum 132kV	13.34	20.62	(6.29)	2.49	(0.03)
Damaturu 132kV	11.06	11.09	(2.66)	2.92	(0.02)
Biu 132kV	10.08	12.87	(4.34)	2.10	(0.01)
Takum 132kV	1.89	3.24	(1.47)	0.13	(0.01)
Savannah 132kV	3.21	3.63	(1.18)	0.80	(0.00)
Wukari 132kV	1.11	3.24	(2.13)	0.00	(0.00)
Damboa 132kV	-	-	-	-	-
Maiduguri 132kV	11.47	12.76	(6.20)	4.91	-
Molai 132kV	8.77	8.23	(3.31)	3.84	-
<b>Total</b>	<b>107.65</b>	<b>127.55</b>	<b>(39.60)</b>	<b>27.27</b>	<b>(0.38)</b>



## 13 DISCO REQUESTED PROJECTS

### 13.1 Introduction

The consultative meetings held with eleven Discos and NERC yielded requests made by the Discos. These requests primarily stemmed from the list of TCN projects discussed during the consultative meetings. They encompassed a variety of needs, including the finalization of ongoing substations and transmission lines, the commencement of new transmission lines and substations, upgrades to existing lines through reconductoring or reconstruction, and the implementation of projects aimed at enhancing power quality. This section provides a detailed account of these requests.

Table 13-1 gives the summary of all the Discos requests. There are total of 175 requests, with Substation Reinforcement being the highest. Benin Disco made the highest number of requests.

Table 13-1: Summary of all Discos requests.

	Line Re-conductoring	New Line	Line Re-construction	Ongoing Line	Proposed Line	Substation Reinforcement	Ongoing Substation	New Substation	Proposed Substation	SLA Equipment	Power Quality	
<b>Abuja</b>	5										2	<b>7</b>
<b>Benin</b>		5	5			14	10	2		4		<b>40</b>
<b>Eko</b>		5		1	1			5	1			<b>13</b>
<b>Enugu</b>				1			18					<b>19</b>
<b>Ibadan</b>	1		1			7	4	3	1			<b>17</b>
<b>Ikeja</b>	3			1		10			1			<b>15</b>
<b>Jos</b>			1	1			1	1	2			<b>6</b>
<b>Kaduna</b>						4	1	7	2			<b>14</b>
<b>Kano</b>	3	1					2	2	3		1	<b>12</b>
<b>Port Harcourt</b>	1			4		6	3					<b>14</b>
<b>Yola</b>		1		1		10	4	1			1	<b>18</b>
	<b>13</b>	<b>12</b>	<b>7</b>	<b>9</b>	<b>1</b>	<b>51</b>	<b>43</b>	<b>21</b>	<b>10</b>	<b>4</b>	<b>4</b>	<b>175</b>



## 13.2 Abuja's Request

The request of Abuja Disco is given in Table 13-2.

Table 13-2: Abuja Disco's Requests from TCN

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
1	Abuja	Reconductoring of Katampe-Kubwa 132kV line	Katampe	Kubwa	Tariff	Line Reconductoring
2	Abuja	Reconductoring of Apo-Karu-Keffi-Akwanga line	Apo	Akwanga	Tariff	Line Reconductoring
3	Abuja	Reconductoring of Akwanga – Lafia Line	Akwanga	Lafia	Tariff	Line Reconductoring
4	Abuja	Reconductoring of Lokoja - Obajana 330KV Line	Lokoja	Obajana	Tariff	Line Reconductoring
5	Abuja	Reconductoring of Shiroro-Minna 132kV DC line	Shiroro	Minna	Tariff	Line Reconductoring
6	Abuja	30MVAR Capacitor Bank			Tariff	Power Qaulity
7	Abuja	50MX Reactor			Tariff	Power Qaulity



## 13.3 Benin's Request

The request of Benin Disco is given in [Table 13-3](#). One significant observation made pertains to the prioritization of certain line projects. Specifically, line projects listed as Priority 12 (Ado Ekiti to Ijesa Isu) and Priority 16 (Ijesha-Isu to Ilupeju) are associated with providing power to the substation projects listed as Priority 9 (Ijesha Isu Substation) and Priority 10 (Ilupeju Substation). Considering this interconnection and the dependencies among these projects, TCN recommends a realignment of priorities.

Consequently, it is suggested that projects currently labeled as Priority 12 and 16 should be reclassified and moved to Priority 11 and Priority 12, respectively. This adjustment ensures a more coherent and efficient project sequence that considers the interrelated nature of these infrastructure developments. By reordering these priorities, TCN aims to streamline the implementation process and enhance the overall effectiveness of these vital energy projects.

**Table 13-3: Benin Disco's Requests from TCN**

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
1	Benin	a. Replacement of the faulty 1x150MVA, 330/132kV Power Transformer b. Upgrading of 2x60MVA with 2x100MVA, 132kV/33kV, Power Transformers c. Construction of additional 2X33kV Feeder Bays	Asaba 132/33kv		SLA	Substation Reinforcement



2	Benin	" Reinforcement with 1 x150MVA 330/132kV Power Transformers" Reinforcement with 1 x 100MVA 132/33KV Power Transformer Replacement of High Voltage Switchgears, and Associated Equipment. Replacement of Obsolete Control and Relay Panels with Digital Control System	Benin 330/132/33KV		WB/NETAP	Substation Reinforcement
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3	Benin	<p>Upgrading of 2 x 30MVA with 2x 60MVA, 132/33kV Power Transformers.</p> <ul style="list-style-type: none"> <li>o Replacement of High Voltage Switchgears, Control &amp; Relay panel with Digital Control system and</li> <li>o Conversion of 6nos. 33kV Indoor to 8No Outdoor.</li> </ul> <p>Rehabilitation of control room</p>	Ondo 132/33kv		WB/NETAP	Substation Reinforcement
4	Benin	<ul style="list-style-type: none"> <li>o Replacement of defective 1x 60MVA 132/33kV with a new 1x 1000MVA 132/33KV Power Transformer</li> <li>o Replacement High Voltage Switchgears, and Associated Equipment</li> <li>o Installation of 4 No Additional Feeder Bays at Effurun</li> </ul>	Effurun 132/33kv		WB/NETAP	Substation Reinforcement



5	Benin	Reconductoring of undersized conductor on the 132KV line between Ughelli and Effurun (10Km)	Ughelli	Effurun	SLA	Line Reconductoring
6	Benin	Reconductoring of 132kV Oshogbo - Akure Single Circuit transmission line	Oshogbo	Akure	SLA	Line Reconductoring
7(a)	Benin	Construction of 2 numbers of additional 33kV Line Bays	lhovbor 132/33KV		SLA	Substation Reinforcement
7(b)	Benin	Upgrade of 60MVA (T1) to 1 x 100MVA	lhovbor 132/33KV		PPI Phase 1	Substation Reinforcement
8	Benin	2 X 150MVA 330/132kV S/S and 2 X 60MVA 132/33kV substation, Akure	Akure 330/132/33KV		FGN/IGR	Ongoing Substation
9	Benin	Construction and Installation of 2x60MVA, 132/33KV Substation at Ijesha-lsu with 6x132KV Line bays Extension/Switching station at Ado-Ekiti (Ikere)	Ijesha-lsu 132/33KV		FGN/IGR	Ongoing Substation



10	Benin	Construction and Installation of 2x60MVA, 132/33KV Substation at Ilupeju and 2x132KV Line bays Extension at Ijesha-Isu	Ilupeju 132/33KV		FGN/IGR	Ongoing Substation
11	Benin	Construction of 1 x 60MVA, 132/33kV Substation at Kwale	Kwale 132/33KV		FGN/IGR	Ongoing Substation
12	Benin	Construction of Ado-Ekiti (Ikere)-Ijesha Isu 132kV Double Circuit Transmission Line	Ado Ekiti 132/33KV	Ijesa Isu 132/33KV	FGN/IGR	Ongoing Substation
13	Benin	2x 150MVA 330/132KV substation at Omotosho	Omotosho 132/33KV		FGN/IGR	Ongoing Substation
14	Benin	2x60MVA 132/33kV substation at Okeagbe, Ondo State and line bays extension at Obajana	Okeagbe 132/33KV		FGN/IGR	Ongoing Substation
15	Benin	2x60MVA, 132/33kV Substation at Ose LGA Headquarters, Ondo State	Ose 132/33KV		FGN/IGR	Ongoing Substation



16	Benin	Construction of Ijesha-Iso - Ilupeju 132kV Double Circuit Transmission Line	Ijesha-Iso 132/33KV	Ilupeju 132/33KV	FGN/IGR	New Line
17	Benin	Construction of 2x60MVA, 132/33KV Substation at Ikare-Akoko and 2x132KV Line bays Extension at Okeagbe	Ikare-Akoko 132/33KV		FGN/IGR	Ongoing Substation
18	Benin	Construction of 132kV Okeagbe-Ikare-Akoko Double Circuit Transmission Line (15km)	Okeagbe 132/33KV	Ikare-Akoko 132/33KV	FGN/IGR	New Line
19	Benin	a. Replacement of 3No 132kV and 9Nos 33kV Current transformers and b. Differential relay at Oghara 132kV TS to restore the standby 30MVA power transformer	Oghara 132/33KV		SLA	Substation Reinforcement



20	Benin	Upgrading of faulty 1x30MVA, 132/33kV Transformer with 1x60MVA power transformer	Afisere 132/33kV		SLA	Substation Reinforcement
21	Benin	a. Replacement of faulty grounding on 1x40MVA, 132/33kV. b. Replacement of differential relay and surge Arrester on 1x40MVA transformer.	Okada 132/33KV		SLA	Substation Reinforcement
22	Benin	Reconstruction of one of Delta-Benin 330kV Transmission Line (107 km) Double Circuit to Quad Conductor 330 Double Circuit Line	Delta 330/132/33KV	Benin 330/132/33KV	AFDB/NTEP	Line Reconstruction
23	Benin	Construction of new Double Circuit (DC) 132kV Okada-Gilli-Gilli	Okada 132/33KV	Gilli-Gilli 132/33KV	AFDB/NTEP	New Line
24	Benin	Construction of new DC Transmission Line 132kV Sapele -	Sapele 132/33KV	Odilli 132/33KV	AFDB/NTEP	New Line



		Odilli DC Transmission Line				
25	Benin	Upgrade of 30MVA (T1) to 1 x 60MVA	Amukpe 132/33KV		PPI Phase 1	Substation Reinforcement
26	Benin	Reconductoring of Irrua- Okpilai 132kV line (43km) with Turn In- Turn Out Tower at Okpila 132kV Substation.	Irrua 132/33KV	Okpilla 132/33KV	Reconductoring	Line Reconductoring
27	Benin	a) 2X60 MVA, 132/33kV transformers 6 X 33kV feeder bay	Gilli-Gilli 132/33KV		AFDB/NTEP	New Substation
28	Benin	Construction of 1 x 150MVA, 330/132kV Substation at Okpai	Okpai 132		FGN/IGR	Ongoing Substation
30	Benin	Construction of 132kV Okpai-Kwale DC Transmission Line	Okpai 132/33KV	Kwale 132/33KV	FGN/IGR	New Line
31	Benin	Reconductoring of Irrua - Benin 132kV line (81km) with Turn In- Turn Out	Irrua 132/33KV	Benin 132/33KV	Reconductoring	Line Reconductoring



		Tower at Irrua 132kV Substation.				
32	Benin	Reinforcement with 1 x 100MVA 132/33KV Power Transformer	Delta 330/132/33KV		WB/NETAP	Substation Reinforcement
33	Benin	Supply and installation of 100MVA 132/33KV power Transformer and associated Switchgears at	Irrua 132/33KV		WB/NETAP	Substation Reinforcement
34	Benin	Reinforcement with 1 x 150MVA 330/132kV Interbus Transformer,	Delta 330/132/33KV		WB/NETAP	Substation Reinforcement
35	Benin	Replacement of High Voltage Switchgears, and Associated Equipment. Replacement of Obsolete Control and Relay Panels with Digital Control System	Effurun 132/33KV		WB/NETAP	Substation Reinforcement



36	Benin	Construction of complete new 132/33kV Substation at Gilli-Gilli	Gilli-Gilli 132/33KV		AFDB/NTEP	New Substation
37	Benin	Transformers Spares: Power Transformers (2x150MVA)	TCN		SLA	SLA Equipment
38	Benin	Transformers Spares: Power Transformers (2x100MVA)	TCN		SLA	SLA Equipment
39	Benin	Transformers Spares: Power Transformers (2x60MVA)	TCN		SLA	SLA Equipment
40	Benin	1 x 60 MVA Mobile Substations	TCN		SLA	SLA Equipment

## 13.4 Eko's Request

The request of Eko Disco is given in [Table 13-4](#). Eko Disco's requests include three 132kV substations, situated within a radius of fewer than 15 kilometers from one another. These substations are earmarked for locations at Lekki Free Trade Zone (FTZ), Oke Abe, and Eleko junction. The simultaneous pursuit of substations at both Oke Abe and Eleko junction, given their close proximity, represents a suboptimal allocation of resources. For optimal resource utilization, it is advisable to choose Oke Abe, while Eleko junction should be omitted. In addition, Oke Abe has land for the proposed substation, while Eleko does not have land.



Table 13-4: Eko Disco's Requests from TCN

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
1	Eko	Omotosho-Epe DC Line	Omotosho	Epe	Tariff	Ongoing Line
2	Eko	Construction of 2X150MVA, 330/132kV and 2X60 MVA, 132/33kV substations at Epe	Epe		Tariff	New Substation
3	Eko	Construction of 2X150MVA, 330/132kV and 2X60 MVA, 132/33kV substations fully equipped	Lekki FTZ		Tariff	New Substation
4	Eko	Epe - Lekki EPZ(25km) 330kv Double Circuit Transmission Line	Epe	Lekki FTZ	Tariff	New Line
5	Eko	132 kV DC line from Epe TS to Eleko Junction TS	Epe	Eleko Junction TS	Tariff	Proposed Line
6	Eko	Construction of 2 X 60MVA 132/33kV Substation at Eleko TS	Election Junction		Tariff	Proposed Substation
7	Eko	132 kV DC line from Epe TS to Oko--Abe TS	Epe	Oko Abe	Tariff	New Line



8	Eko	Construction of 2 X 60MVA 132/33kV Substation at Oko-Abe	Oko Abe		Tariff	New Substation
9	Eko	Construction of 12.5km of new 330kV double circuit line from new Ejio 330/132/33kV substation to Olorunsogo 330kV switchyard inclusive of 1.5km 2x 330KV DC multi circuits line	Ejio	Olorunshogo	JICA	New Line
10	Eko	Construction of 29.6km of new 330kV double circuit line from new Ejio 330/132/33kV substation to Ajegunle (New Agbara) 330/132/33kV substation	Ejio	New Agabra	JICA	New Line



11	Eko	Construction of 36.2km of new 132kV double circuit line from New Agbara (Ajegunle) 330/132/33kV substation to the proposed Badagary 132/33kV substation.	New Agbara	Badagry	JICA	New Line
12	Eko	Construction of complete new 330/132/33kV AIS substation at Ajegunle (New Agbara)	New Agbara		JICA	New Substation
13	Eko	Construction of 2 X 60MVA 132/33kV substation at Badagary	Badagary		JICA	New Substation

## 13.5 Enugu's Request

The request of Enugu Disco is given in [Table 13-5](#).

[Table 13-5: Enugu Disco's Requests from TCN](#)

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
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1	Enugu	Construction of 2x60 MVA 132kV substation Nnewi	Nnewi		Tariff	Ongoing Substation
2	Enugu	Completion of Nnewi 2x60MVA Transmission project and 132kV Onitsha-Nnewi line. (to reduce Feeder length of 189.96km)	Nnewi	Onitsha	Tariff	Ongoing Line
3	Enugu	Complete Installation of 100MVA, 132/33KV.GCM Onitsha	Onitsha		Tariff	Ongoing Substation
4	Enugu	2X60MVA,132/33kV transformers,NINTH MILES	Ninth Mile		Tariff	Ongoing Substation
5	Enugu	Complete installation of 1 x 60MVA, 132/33kV Transformer OJIo (to stop Load shedding on Udi, Achi, Oji-Urban and Orumba 33kV Feeders)	Oji		Tariff	Ongoing Substation
6	Enugu	Construction/Completion of Arochukwu 1 X 40MVA.	Arochukwu		Tariff	Ongoing Substation



7	Enugu	Construction /Completion of Orlu 2 X 60MVA. (to reduce Orlu Feeder length of 265.22km and improve supply to Orlu and Akokwa)	Orlu		Tariff	Ongoing Substation
8	Enugu	Upgrading of 330kV Onitsha - Enugu Transmission Line	Enugu		Tariff	Ongoing Substation
9	Enugu	Construction/Completion of Okigwe 2 X 60MVA T/S. (to reduce Okigwe Feeder length of 399.37km and improve supply to Okigwe, Mbaise and Orlu)	Okigwa		Tariff	Ongoing Substation
10	Enugu	o Construction of 2x60MVA, 132/33kV substation at Amasiri, Afikpo	Amasiri		Tariff	Ongoing Substation
11	Enugu	Completion of Installation of 1 X 60MVA Power TRF in Nibo . (to reduce Agulu Feeder length of 220.29km and Neni Feeder length of 113.44km)	Nibo		Tariff	Ongoing Substation



12	Enugu	Completion of the 2 X60MVA Project.Abor Mbaise	Abor Mbaise		Tariff	Ongoing Substation
13	Enugu	Installation of 2 X 60MVA at Egbu and replacement of bad 33KV Breakers. (to reduce Airport Feeder length of 180.26km and improve supply to Ngo-Okpala)	Egbu		Tariff	Ongoing Substation
14	Enugu	o Construction of 2x60MVA, 132/33kV substation at Ideato	Ideato		Tariff	Ongoing Substation
15	Enugu	Construction of 2x30/40MVA 132/33kV substation MBALANO	Mbalano		Tariff	Ongoing Substation
16	Enugu	Construction of 2x60MVA, 132/33kV substation NENWE	Nnewe		Tariff	Ongoing Substation
17	Enugu	o Construction of 2x60MVA, 132/33kV substation UMUCHU,IBUGHUBU	Umuchu, Ibughubu		Tariff	Ongoing Substation
18	Enugu	Construction of 2x60MVA, 132/33kV Substation ,AGULERI	Aguleri		Tariff	Ongoing Substation



19	Enugu	Construction of 2x60MVA, 132/33kV substation at Ifitedunu and 2x132kV line bays extension at Onitsha.	Onitsha		Tariff	Ongoing Substation
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## 13.6 Ibadan's Request

The request of Ibadan Disco is given in [Table 13-6](#). Ibadan Disco requested for 7 new substations to be built in: 1) Sagamu Interchange, 2) Sapaade 3) Ogbomosho 4) Likosi 5) Ejio and 6) New Agbara 7) Asejire.

Likosi, Ejio and New Agbara are part of the Lagos Ogun JICA project which has secured funds.

It should be noted that both the Sagamu Interchange and Sapaade are situated within a relatively short distance of fewer than 20 kilometers from each other. Importantly, a substation located at Saapade has received approval from the Federal Executive Council (FEC) under the Internally Generated Revenue (IGR) project.

In contrast, the proposed Interchange 132kV substation is at conception stage. As of the present moment, no specific site identification or preparation has been carried out for this proposed substation. Consequently, further assessment and site selection procedures are imperative to ascertain a suitable location for the Interchange 132kV substation. These additional steps are pivotal to evaluate the viability and practicality of establishing this substation.

In light of these considerations, a pragmatic approach suggests that focusing on completing the Sapaade Substations, which are intended to serve a similar purpose to the Interchange 132kV substation, may be more feasible and expedient.

[Table 13-6: Ibadan Disco's Requests from TCN](#)

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
1	Ibadan	Upgrading and Dualization of the Ayede-Sagamu-Ijebu ode 132KV line .	Ayede	Ijebu Ode	Tariff	Line Reconstruction



2	Ibadan	Installation of additional 100MVA, 132/33kV transformer at Ibadan North 330kV/132kV/33kV TS	Ibadan North		Tariff	Substation Reinforcement
3	Ibadan	Reconductoring of Eleyele to Ibadan North 132Kv line	Eleyele	Ibadan North	Tariff	Line Reconductoring
4	Ibadan	Upgrading of 1x40MVA & 1x45MVA Mobitra to 1x100MVA, 132/33kV & 40MVA, 132/33KV Transformer including 2x33kV feeder bays at Jericho 132	Jericho		Tariff	Substation Reinforcement
5	Ibadan	Replacement of faulty 60MVA, 132/33kV, Transformer at Ijebu-ode TS	Ijebu Ode		Tariff	Substation Reinforcement
6	Ibadan	Completion of 100MVA, 132/33kV upgrade at Ota TS	Ota		Tariff	Substation Reinforcement
7	Ibadan	Upgrading of Iwo 1 x 40MVA, 132/33kV to 60MVA, 132/33kV Transformer	Iwo		Tariff	Substation Reinforcement



8	Ibadan	Construction of 1x60MVA, 132/33kV Ayede 132 to Eleyele 132kV	Eleyele		FGNPC	Ongoing Substation
9	Ibadan	Construction of 2x60MVA 132/33KV Substation at Interchange 132kV	Sagamu Interchange		Tariff	Proposed Substation
10	Ibadan	Installation of additional 60MVA, 132/33kV transformer at Ganmo 330/132/33kV Ts	Ganmo		Tariff	Substation Reinforcement
11	Ibadan	Construction of 2 x 60MVA 132/33kV Substation at Ogbomosho 132kV	Ogbomosho		Tariff	Ongoing Substation
12	Ibadan	Installation of 1x 60MVA at Ile-Ife 132kV/33kV TS	Ile-Ife		Tariff	Substation Reinforcement
13	Ibadan	Construction of complete new 1x150MVA, 330/132kV with 2x60MVA, 132/33kV at Asejire	Asejire		Tariff	Ongoing Substation
14	Ibadan	Construction of 1x60MVA 132/33KV Substation at Sapaade 132kV	Sapaade		Tariff	Ongoing Substation



15	Ibadan	Construction of complete new 330/132/33kV AIS substation at Likosi (Ogijo) at Likosi 330/132/33	Likosi		JICA	New Substation
16	Ibadan	Construction of complete new 330/132/33kV AIS substation at Ejio (Arigbajo) at Ejio 330/132/33	Ejio		JICA	New Substation
17	Ibadan	Construction of complete new 330/132/33kV AIS substation at Ajegunle (New Agbara) 330/132/33	New Agbara		JICA	New Substation

## 13.7 Ikeja's Request

The request of Ikeja Disco is given in [Table 13-7](#).

[Table 13-7: Ikeja Disco's Requests from TCN](#)

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
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1	Ikeja	Upgrade of Ikeja West-Alimosho-Ogba(-Alausa)-Otta-Papalanto Ring	Ikeja West	Otta	Tariff	Line Reconductoring
2	Ikeja	Reinforcement with addition of 1 x 100MVA 132/33kV Power Transformer at Alausa TS	Alausa		Tariff	Substation Reinforcement
3	Ikeja	Upgrading of T1 30MVA To 60MVA transformer at Itire TS	Itire		Tariff	Substation Reinforcement
4	Ikeja	Completion of conversion of 33kV indoor breaker to outdoor breaker at Akoka TS	Akoka		Tariff	Substation Reinforcement
5	Ikeja	Upgrade 30MVA to 100MVA at Maryland TS	Maryland		Tariff	Substation Reinforcement
6	Ikeja	Upgrading of 2 x 30MVA transformer to 2 X 60MVA transformer at Amuwo TS	Amuwo		Tariff	Substation Reinforcement



7	Ikeja	Reinforcement with addition of 1 x 60MVA 132/33kV Power Transformer at Oke Aro TS TS	Oke Aro		Tariff	Substation Reinforcement
8	Ikeja	Upgrading of 45MVA transformer 60MVA at Isolo TS	Isolo		Tariff	Substation Reinforcement
9	Ikeja	Construction of Additional Bays at Ejigbo TS	Ejigbo		Tariff	Substation Reinforcement
10	Ikeja	Construction of Additional Bays at Ogba TS	Ogba		Tariff	Substation Reinforcement
11	Ikeja	Upgrade of Egbin-Ikorodu line	Egbin	Ikorodu	Tariff	Line Reconductoring
12	Ikeja	Reinforcement with addition of 1 x 60MVA 132/33kV Power Transformer at Oworo TS	Oworo		Tariff	Substation Reinforcement
13	Ikeja	Upgrade of Akangba-Isolo line	Akangba	Isolo	Tariff	Line Reconductoring
14	Ikeja	132kV Multi-Circuit Oke Aro to Alausa Transmission Line	Oke Aro	Alausa	NPDHC	Ongoing Line
15	Ikeja	Propose KARA/BERGER 132/33kV Station.	Kara/berger		Tariff	Proposed Substation



## 13.8 Jos's Request

The request of Jos Disco is given in Table 13-8.

Table 13-8: Jos Disco's Requests from TCN

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
1	Jos	Completion of Transposition on the Uguaji-Jos 330kV line	Ugwuaji	Jos	Tariff	Line Transposition
2	Jos	Construction of the Makeri-Pankshin 132KV DC Line.	Makeri	Pankshin	Tariff	Ongoing Line
3	Jos	Construction of complete new 132/33kV substation at Biliri	Biliri		WB/NETAP	Ongoing Substation
4	Jos	Construction of complete new 330/132/33kV Substation at Bauchi by turning in and turning out of the existing 330kV Single Circuit Jos-Gombe line at Bauchi	Bauchi		AFD NOR CORR	New Substation



5	Jos	Construction of the Alkaleri 132/33kV substation	Alkaleri		Tariff	Proposed Substation
6	Jos	Construction of the Misau 132/33kV substation	Misau		Tariff	Proposed Substation

## 13.9 Kaduna's Request

The request of Kaduna Disco is given in [Table 13-9](#).

[Table 13-9: Kaduna Disco's Requests from TCN](#)

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
1	Kaduna	Construction of complete new 330/132/33kV Substation at Millennium City, Kaduna by turning in and turning out of the existing 330kV DC Kaduna Jos line at Millennium City,	Millennium City		AFDB/NTEP	New Substation



2	Kaduna	Construction of complete new 330/132/33kV Substation at New Sokoto	Sokoto		AFD NOR CORR	New Substation
3	Kaduna	Installation of 1x60 MVA, 132/33kV power transformer at Sokoto 132/33kV TS	Sokoto		SLA	Substation Reinforcement
4	Kaduna	Construction of complete new 132/33kV Substation at Rigasa by turning in and turning out of the existing 132kV DC Kaduna Zaria line at Rigasa	Rigasa		AFDB/NTEP	New Substation
5	Kaduna	Construction of complete new 330/132/33kV Substation at Zaria by turning in and turning out of the existing 330kV SC Kaduna Kano line at Zaria,	Zaria		AFDB/NTEP	New Substation



6	Kaduna	Upgrading Of Existing 90MVA at Birnin Kebbi TS	Birnin Kebbi		WB/NETAP	Substation Reinforcement
7	Kaduna	Construction of complete new 132/33kV Substation at Jaji by turning in and turning out of the existing 132kV DC Kaduna - Zaria line at Jaji	Jaji		AFDB/NTEP	New Substation
8	Kaduna	Upgrading of 1x30 MVA to 1x60 MVA, 132/33kV Transformer at Gusau 132/33kV TS	Gusau		SLA	Substation Reinforcement
9	Kaduna	Construction and installation of 1x45MVA Mobitra 132/33kV down dropper (on existing B/Kebbi-Sokoto 132kV S/C transmission line) TS at Argungu	Argungu		SLA	New Substation
10	Kaduna	Installation of 1X150MVA 330/132/33kV transformer at Mando TS	Mando		Tariff	Substation Reinforcement



11	Kaduna	Additional 132/33kv Transmission Station At Eastern Bypass Kaduna To Take Care Of The Growing Expansion In The Region	Eastern ByePass (Kaduna)		Tariff	Proposed Substation
12	Kaduna	Construction of new substation at New Industrial Zone along Kaduna – Abuja express way	New Industrial Zone (Kaduna Abuja Express Way)		Tariff	Proposed Substation
13	Kaduna	Construction and Installation of 2x60MVA, 132/33KV Substation at Kafanchan with 2x132KV Linebays at Jos	Kafanchan		Tariff	Ongoing Substation
14	Kaduna	Construction of complete new 330/132/33kv Substation at Kalgo	Kalgo		AFD NOR CORR	New Substation



## 13.10 Kano's Request

The request of Kano Disco is given in Table 13-10.

Table 13-10: Kano Disco's Requests from TCN

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
1	Kano	Mando –Kano 2nd 330kV Line	Mando	Rimin Zakara	AFDB/NTEP	New Line
2	Kano	Walalambe 132KV	Walalambe		Tariff	New Substation
3	Kano	Jogana 330kV	Jogana		AFD NOR CORR	New Substation
4	Kano	Reconductoring of Kumbotso - Dakata 132kV line	Kumbotso	Dakata	Tariff	Line Reconductoring
5	Kano	Reconstruction of Kano - Dan Agundi 132kV single circuit transmission line	Kumbotso	Dan Agudi	Tariff	Line Reconductoring
6	Kano	Refurbishment of all 132kV sub-stations existing capacitor Banks and installation of additional ones in stations where there is non within KEDCO operational area for power quality			Tariff	Power Qaulity
7	Kano	Rimin Zakara 330KV	Rimin Zakara		WB/NETAP	Ongoing Substation



8	Kano	Reconductoring of Kumbotso - Hadeija	Kumbotso	Hadeija	Tariff	Line Reconductoring
9	Kano	Dan- Gwauro 2x60MVA, 132/33kV	Dan-Gwauro		Tariff	Proposed Substation
10	Kano	Dawanau 2x60MVA, 132/33kV	Dawanau		Tariff	Proposed Substation
11	Kano	Bela/Tagurza 2x60MVA, 132/33kV TS	Bela/Tagurza		Tariff	Proposed Substation
12	Kano	Katsina 330KV	Katsina		Tariff	Ongoing Substation

## 13.11 Port Harcourt's Request

The request of Port Harcourt Disco is given in [Table 13-11](#).

[Table 13-11: Port Harcourt Disco's Requests from TCN](#)

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
1	Port Harcourt	Installation of additional 1x60MVA, 132/33kV transformer	Rumuosi		SLA	Substation Reinforcement
2	Port Harcourt	Reinforcement with 1 x 100MVA 132/33kV Power Transformers. Outfitting of bay/ provision of additional 33kv breakers	Port Harcourt Main		WB/NETAP	Substation Reinforcement



3	Port Harcourt	Reinforcement with 1 x 100MVA 132/33kV Power Transformers,	Port Harcourt Town		WB/NETAP	Substation Reinforcement
4	Port Harcourt	Addition of 2nd 1 x60MVA, 132/33kV transformer	Elelenwo		SLA	Substation Reinforcement
5	Port Harcourt	Reconstruction of Existing Double 132kV Line Circuit to 4 x 132kV Line Circuit Using the Same Right of Way from Afam to Port Harcourt Main (37.8km), and Creating Additional 3 x 132kV Line Bays at Afam and Port Harcourt Main TS	Port Harcourt Town		Tariff	Line Reconductoring
6	Port Harcourt	Procurement of spare breakers, VTs, CTs, 33kv breakers, T-connectivity, transformer oil, etc at Port Harcourt Mains, Port Harcourt Town, Afaha Ube, Eket TS, Ekim TS, Calabar, Yenegoa TS			Tariff	Substation Reinforcement



7	Port Harcourt	Construction of 132kv line from Abakiliki to Ikom and to Obudu	Abakiliki	Obudu	NDPHC	Ongoing Line
8	Port Harcourt	Construction 132/33kv TS at Ikom	Ikom		NDPHC	Ongoing Substation
9	Port Harcourt	Construction 132/33kv TS at Obudu	Obudu		NDPHC	Ongoing Substation
10	Port Harcourt	Upgrade of existing 40MVA to 2x60MVA power transformers along with breakers and 33kV bays subject to handover to TCN	Rumuosi			Substation Reinforcement
11	Port Harcourt	Completion and Commissioning of On-going TS at Ogoja	Ogoja		Tariff	Ongoing Substation
12	Port Harcourt	Completion and commissioning 330kv line from Afam to Onne and 2x150MVA, 1x60MVA and 330/132kv TRX substation	Afam	Onne	NDPHC	Ongoing Line



13	Port Harcourt	Construction of 2x330kV line bays extensions each at Delta and Port Harcourt substations	Delta	Port Harcourt	Tariff	Ongoing Line
14	Port Harcourt	Construction of Delta-Port Harcourt 330kV DC line	Delta	Port Harcourt	Tariff	Ongoing Line

## 13.12 Yola's Request

The request of Yola Disco is given in [Table 13-12](#).

[Table 13-12: Yola Disco's Requests from TCN](#)

Disco Rank	Disco	TCN Project Description	Station 1	Station 2	Finance Source	Type
1	Yola	Yola/Song/Little Gombi/Gulak/Mubi 132kV DC Line	Yola	Mubi	Tariff	Ongoing Line
2	Yola	2X60MVA, 132/33kV TS	Mubi		Tariff	Ongoing Substation
3	Yola	Uprating of 2X15MVA to 2X60MVA, 132/33kV TS	Savanna		Tariff	Substation Reinforcement
4	Yola	Molai/Bama 132kV DC Line	Molai	Bama	Tariff	New Line
5	Yola	2X60MVA, 132/33kV TS	Bama			New Substation



6	Yola	132kV Terminal Equipment at Yola TS	Yola		Tariff	Substation Reinforcement
7	Yola	Capacitors Banks, or other forms of FACTS compensation needed to improve our voltage profile in Borno state and environs	Molai TS and Baga Road Maiduguri		Tariff	Power Qaulity
8	Yola	Upgrade and Reinforcement to 2X100MVA 132/33KV TS	Yola TS		WB/NETAP	Substation Reinforcement
9	Yola	Additional 1X150MVA, 330/132KV TS	Yola TS		WB/NETAP	Substation Reinforcement
10	Yola	330/132KV TS 2X150MVA, 132/33KV 1X60MVA	Mayo Belwa TS		WB/NETAP	Substation Reinforcement
11	Yola	Reinforcement of 132/33kV, 2X30MVA	Biu TS		WB/NETAP	Substation Reinforcement
12	Yola	Upgrade with 1X150MVA 330/132kV 2X60MVA, 132/33kV TS	Molai TS		Tariff	Substation Reinforcement
13	Yola	Reinforcement and complete rehabilitation with 2X60MVA, 132/33kV TS	Dambova TS		WB/NETAP	Substation Reinforcement



14	Yola	Upgrade from 132/33kV TS to 330/132/33kV TS with 1X60MVA Mobitra 132/33kV TS	Jalingo TS		WB/NETAP	Substation Reinforcement
15	Yola	Reinforcement with 2X60MVA 132/33kV TS	Potiskum TS		FGNPC	Substation Reinforcement
16	Yola	2X60MVA, 132/33kV TS	Hong		Tariff	Ongoing Substation
17	Yola	2X60MVA, 132/33kV TS	Song		Tariff	Ongoing Substation
18	Yola	2X60MVA, 132/33kV TS	Little Gombi			Ongoing Substation

### 13.13 Projects Selected by System Analysis

The System Planning Department conducted a system need and growth analysis, leading to the selection of the projects [Table 13-13](#)

[Table 13-13: System Planning Selected Projects](#)

No	Region	Project Title	Project Status	Project Sponsor	Justification
1	ABUJA	Construction of Gwagwalada- New Apo 330kV DC Line	New	Tariff	Required to improve supply reliability in Abuja and for evacuation of the 300MW First Phase of 900MW NNPC Gas power plant at Gwagwalada.



2	ABUJA	Upgrade of Shiroro-Triple Point(Mararaba)-Jebba 330kV DC line.	New	Nil	Required for more capacity of South - North power transfer and vice versa in view of upcoming generators in the North-West region.
3	ABUJA	Installation of Mobile and variable Capacitor Bank in Bida, Suleija	New	Nil	required to address low voltage in the area and to supply the forecasted demand.
4	BENIN	Completion of Ihovbor-Akure-Osogbo 330kV DC Line	Ongoing	FGN/IGR	Required for evacuation of more power from Ihovbor as well as system security and reliability
5	BENIN	Completion of Turn in Turn out of existing Ihovbor-Osogbo 330kV Line at Akure 330/132/33kV substation	Ongoing	FGN/IGR	Required to divert the load at Akure and Ado Ekiti from Osogbo to Akure 330kV substation.
6	BENIN	Turn in Turn out of Benin-Ajaokuta 330kV line at Ihovbor	New	Nil	Required for evacuation of both Azura and Ihovbor generation and for reliability of supply.
7	BENIN	Upgrade of Benin-Omotosho 330kV Line to Quad Circuit 330kV line	New	Nil	Required for Evacuation of generation from Benin towards Lagos area and improve grid reliability.
8	LAGOS	Completion of Omotosho-Epe-Ajah 330kV DC Line and 330/132/33kV Substation at Epe	Ongoing	FGN/IGR	The project is the evacuation corridor for the 900MW Pacific power plant which has almost completed. It also provides reliability for the Benin-Egbin and Omotosho – Ikeja West 330kV lines.
9	LAGOS	Construction of Ikeja West-Arighbajo 330kV DC Line	Committed	JICA	Required for reliability of Olorunshogo-Ikeja West 330kV line. JICA
10	LAGOS	Construction of Arighbajo-Oshogbo 330kV DC Line	Committed	JICA	Required for reliability of Ayede-Oshogbo 330kV line.



11	LAGOS	Construction of Omotosho-Ogijo 330kV DC Line and Ogijo 330/132/33kV Substation	Committed	JICA	Required to provide reliability for Benin-Egbin and Benin-Omotosho330kV lines.
12	ENUGU	Construction of Delta-Okpai 330kV DC line	New		Support evacuation of Okpai Phase II
13	BAUCHI	Commissioning of Second Kaduna-Jos 330kV Line	Almost Completed	AfDB	Required for system security
14	BAUCHI	Construction of Second Jos-Gombe 330kV Line	New	NIL	Critical for system reliability and security in the North Eastern part of the country.
15	BAUCHI	Completion of Transposition on the Uguaji-Jos 330kV line			To address Voltage imbalance being experienced along line.
16	BAUCHI	Construction of Second Jos-Gombe 330kV Line	New	NIL	Critical for system reliability and security of supply in the North Eastern part of the country.
17	BAUCHI	Construction of 330kV line from Makurdi to Jalingo	New	NIL	For System Reliability to create a ring network for the North East region
18	BAUCHI	Construction of 330kV line from Yola to Maiduguri	New	NIL	For System Reliability to create a ring network for the North East region
19	KADUNA	Kainji-Kalgo 330kV DC line and Kalgo 330/132/33kV Substation	Ongoing	AFD	AFD North core projects is required and recommended for provide network security and supply reliability to the north west.
20	KADUNA	Turn in Turn out of existing Kainji - Birnin Kebbi 330kV Line at Kalgo	Ongoing	AFD	Recommended to improve system reliability.



21	KADUNA	Reinforcement of Shiroro-Kaduna 330kV double circuit transmission line to Quad conductor	New	Nil	Required for System security and reliability and for more evacuation from Zungeru Hydro power station towards Kaduna.
22	KADUNA	Mararaba- Millenium City 330kV LIne	New	Nil	Required for system security and additional route for power transfer to and from North west.
23	KANO	Completion of Second Kaduna-Kano 330kV Line including Turn in Turn out into proposed Zaria 330/132kV SS	Ongoing	FGN/IGR	Required both for system security in the North West and to meet demand of Kano Disco.
24	Port Harcourt	Additional 2X162MVA Intrbus Transformers at Afam IV 330/132/33kV Substation	New	NIL	Required for more evacuation from Rivers IPP, Afam Fast power.
25	Port Harcourt	1X162MVA Interbus transformer at Afam I -III Substation	New	NIL	Required for more evacuation from Rivers IPP, Afam Fast power.
26	Port Harcourt	Turn in Turn out of Afam to Onne 330kV line into Rivers IPP	New	NIL	Required to evacuate second generationn Unit of Rivers IPP.

## 13.14 World Bank Power Sector Recovery Program Projects

TCN is in the process of securing a loan from the World Bank, under the Power Sector Recovery Program, to initiate specific projects. It's important to note that this loan is earmarked exclusively for endeavors involving existing substations, the acquisition of digital and automation tools, software, and other associated processes. It cannot be allocated for new substations, new transmission lines, or the finalization of ongoing substation or line projects. The projects that met this requirement were sent to World Bank for preparation of the loan. The projects shown in [Table 13-14](#) are mostly automation or process improvement related.



Table 13-14: World Bank Power Sector Recovery Nominated Projects

	Total (USD)	2023 (USD)	2024(USD)	2025(USD)	2026(USD)
Consultancy Services for Operational Studies of Power System Harmonics on the Nigerian Grid.	300,000		300,000		
Design, Manufacture and Supply of Digital Grid Frequency Meters	500,000		100,000	400,000	
Procurement and Installation of Grid GPS Clock in the Control Rooms across the network	500,000		500,000		
Procurement and Installation of Weather Station at Grid Critical Nodes	375,000	375,000			
Development and Deployment of Outage Management and Data Logging Software	375,000		375,000		
Provision and Installation of Automated Synchronizing System & Commissioning for the critical Grid System nodes	750,000			750,000	
Operational Intelligence Tool for System Performance Management	10,000,000	5,000,000	5,000,000		
Upgrade of the current IoT system and expansion to areas not already covered	10,000,000	2,000,000	4,000,000	2,000,000	2,000,000
Consultancy Services on System Automatic Load Shedding Scheme.	375,000		375,000		
SCADA Augmentation projects	50,000,000			25,000,000	25,000,000
Provision for Communication infrastructure to fill existing gaps for efficient function of ongoing SCADA System project.	60,000,000			30,000,000	30,000,000
Development of Market Operator's Software, Processes and Systems	20,000,000	10,000,000	5,000,000	5,000,000	
Review and Development of Long term Transmission Expansion Plan.	5,000,000	5,000,000			



Upgrade, rehabilitation and digitization of about 70 old substations not covered under the NEPTAP project	150,000,000	35,000,000	60,000,000	30,000,000	25,000,000
Procurement of Critical spares for prompt network maintenance	50,000,000	20,000,000	20,000,000	10,000,000	
Ten (10) Drones for patrol of transmission lines in the 10 transmission regions	10,000,000	10,000,000			
Deployment of Asset Performance Management System for real-time monitoring of assets condition	20,000,000		10,000,000	10,000,000	
Implementation of a Wide Area Protection Scheme/ Remedial Action Protection at critical Areas of the Grid	50,000,000		25,000,000	25,000,000	
Development of customised tool for Monitoring and Evaluation of the system	3,000,000	3,000,000			
Provision for Voltage Compensation equipment across the system	50,000,000		25,000,000	25,000,000	
Procurement of Protection System Lab set	150,000	150,000			
Procurement of Realtime Digital Simulator	1,000,000		1,000,000		
Strategies and Processes Development and Consultancy	10,000,000	3,000,000	3,000,000	4,000,000	
Consultancy on the Readines, Preparation and Impact of Seperation of ISO from TCN	2,000,000	2,000,000			
Project Consultancy Support	5,000,000	1,250,000	1,250,000	1,250,000	1,250,000
Operations and Logistical Support	1,000,000	500,000	500,000		
Operational and Monitoring Vehicles	2,000,000	1,000,000	1,000,000		
<b>TOTAL</b>	<b>512,325,000</b>	<b>98,275,000</b>	<b>162,400,000</b>	<b>168,400,000</b>	<b>83,250,000</b>



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## 14 TRANSMISSION SERVICE PROVIDER (TSP) RELATED COSTS

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### 14.1 About the TSP

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The Transmission Service Provider (TSP) holds the responsibility of maintaining and expanding the grid infrastructure. This vital role entails ensuring the smooth and reliable operation of the power transmission network, safeguarding its integrity, and expanding for its growth to meet the increasing electricity demands.

Maintenance of the grid infrastructure is crucial for ensuring the uninterrupted flow of electricity and minimizing downtime due to equipment failures or faults. The TSP conducts regular inspections, repairs, and upgrades to keep the transmission lines, substations, and associated equipment in optimal condition, thus enhancing the overall system reliability and reducing the risk of outages.

Additionally, as the electricity demand grows over time, the TSP plays a pivotal role in expanding the grid to accommodate the increasing load requirements. This involves strategic planning, designing, and implementing new transmission lines, substations, and associated infrastructure to connect new power generation sources and meet the power consumption needs of consumers.

### 14.2 Compensation for Lands and Right-of-Ways

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As TCN undertakes various projects to expand and upgrade the power transmission infrastructure, it often needs to acquire lands and right-of-ways for constructing new substations, transmission lines, and other related facilities. These lands and right-of-ways may be owned by individuals, communities, or government entities. In such cases, TCN is legally obligated to compensate the landowners or right-holders for the use of their property.

Compensation serves as a fair and equitable arrangement to compensate individuals or communities for the temporary or permanent use of their land. It is essential to uphold principles of fairness, transparency, and adherence to relevant laws and regulations when determining compensation amounts. Failure to provide timely and adequate compensation can lead to legal disputes, social unrest, and project delays, which can significantly impact TCN's project timelines and overall reputation.

To ensure the successful implementation of projects funded by development partners like AFD, AFDB, and JICA, TCN must demonstrate its commitment to fulfilling its compensation obligations. These international funding agencies place a strong emphasis on compliance with social safeguards, including proper compensation practices, before releasing funds. Non-compliance with compensation requirements can lead to the suspension or delay in disbursement of funds, hindering the project's progress.



Properly compensating affected landowners and right-holders fosters positive relationships between TCN and local communities, promoting a conducive environment for successful project execution. TCN engages in transparent and constructive dialogue with affected parties, addressing their concerns and ensuring that compensation processes are carried out fairly and efficiently. This proactive approach helps build trust and cooperation between TCN and stakeholders, ultimately leading to smoother project implementation and sustainable development outcomes.

The compensation costs for key TCN projects are shown [Table 14-1](#).

**Table 14-1: Land Compensation Costs**

#	Project	Nb.
1	Alaoji-Onitsha line	12
2	Delta-Benin line	5
3	Mando-Rimi Zakara line	2.2
4	WAPP North Core line	2.2
5	WAPP South Core line	7.5
6	Kainji – Birnin.Kebbi – Sokoto line	6.5
7	Katsina-Daura-Gwiwa Jogana-Kura line	6
	<b>Total</b>	<b>41.4</b>

## 14.3 Enterprise Resource Platform Project

TCN is currently implementing an Enterprise Resource Platform project. The phase 1 of the project is ongoing and is being funded under the AFB Abuja Ring Fence Program. TCN is seeking for 24 billion Naira to carry out phase two of the project. It is expected that Phase 1 will be completed by 2024 and Phase 2 will commence 2025.

## 14.4 TSP Maintenance Projects

TSP will carry out the following maintenance activities listed in [Table 14-2](#).

**Table 14-2: TSP Maintenance Projects**

No	Description of Maintenance Work	2024
1	Cost for the replacement of 16Nos. 330kV Circuit Breaker in TCN network	80,000,000
2	Cost for the replacement of 23Nos. 1320kV Circuit Breaker in TCN network	64,400,000
3	Cost for the replacement of 58Nos. 33kV Circuit Breaker in TCN network	63,800,000
4	Cost for the replacement of 11Nos. 330kV Isolators in TCN network	7,700,000
5	Expected cost of the replacement of 29No. 132kV Isolators in TCN network	14,500,000



6	Cost for the replacement of 60Nos. 33kV Isolators in TCN network	16,800,000
7	Maintenance cost of 330kV, 132kV and 33kV Circuit Breakers in TCN network	233,150,000
8	Maintenance cost of 330kV, 132kV and 33kV Isolators in TCN network	471,200,000
9	Cost to improve earthing system in TCN Substations	35,500,000
10	Maintenance cost of 110VDC Battery Banks in TCN network	30,000,000
11	Emergency Repairs/Refurbishment of defective 9 Nos. 330KV, 13Nos. 132KV and 26Nos. 33KV Crompton Greaves (CG) make circuit breakers in TCN network	438,081,242
12	Emergency rehabilitation of Aja-Alagbon 330kV GIS Bay (diameter 01) at Alagbon Transmission Substation.	223,221,220
13	The Urgent unbanking of 162MVA 330/132/33KV AT2 Power Transformer bay at Ajaokuta 330/132kV Transmission Substation.	291,222,321
14	Construction of 2Nos. 132kV lattice terminal towers, 132kV line bay extension gantries and stringing of 132kV conductor for Turn - in and Turn - out at Amukpe Transmission Substation.	243,634,642
15	Conversion of indoor 33kV GIS Circuit Breakers on 40MVA, 132/33kV Transformer (T1) Secondary Circuit Breakers and 3Nos. 33kV outgoing Circuit Breakers bays at Dutse Transmission Substation.	488,081,242
16	Construction of 33kV Secondary bay outdoor and 33kV feeder bay for IBA feeder at Ojo Transmission Substation.	286,635,873
17	Construction of 132kV Line Bay for Turn - in and Turn - out at Okpella Transmission Substation.	221,221,320
18	Construction of 132kV Line Bay for Turn - in and Turn - out at Okene Transmission Substation.	236,830,345
19	Construction of two 2Nos. 132kV bays at Ota and Papalanto Transmission Substations.	225,453,868
20	Procurement of 20Nos. 110VDC 600AH Battery Banks for system use	400,000,000
21	Procurement of new 15Nos. 330kV, 20Nos. 132kV and 70Nos 33kV Circuit Breaker for use in TCN network	342,453,867
22	Procurement of 10 sets 330kV, 20 sets 132kV and 30 set 33kV Lightning Arresters for system use	198,765,343
23	Procurement of new 15Nos 330kV, 25Nos. 132kV and 100Nos 33kV Isolators for use in TCN network	389,342,763
24	Procurement of 5 sets 30KVA Generators for station use	80,000,000
25	Procurement of 150 cylinders of SF6 gas for system use	225,000,000
26	<b>Regulatory Compliance Software System</b>	500,000,000
27	<b>Asset Maintenance Software</b>	500,000,000
	<b>TOTAL</b>	<b>6,081,994,046</b>

TSP will carry out the following line reconductoring in **Error! Reference source not found..** These projects were selected based on analysis of the Discos forecast by System planning,



## 14.5 Supporting TSP Departments

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As the Transmission Service Provider (TSP), the following departments are important to its functioning:

### **A. Research and Development**

The Research and Development department plays a crucial role in exploring innovative technologies, methodologies, and practices to enhance the efficiency, reliability, and sustainability of the power transmission network. It conducts studies, tests new equipment, and seeks advancements in transmission infrastructure to stay at the forefront of the power industry.

### **B. Monitoring and Evaluation**

The Monitoring and Evaluation department is responsible for continuously monitoring the performance and operation of the transmission network. It assesses system data, analyzes performance metrics, and identifies areas for improvement, ensuring the grid operates optimally and meets established standards.

### **C. Public Affairs**

The Public Affairs department manages communications with various stakeholders, including customers, government agencies, regulatory bodies, and the general public. It provides information about the TSP's activities, responds to inquiries, and fosters positive relationships with the community.

### **D. Corporate Planning**

The Corporate Planning department is tasked with developing long-term strategies and plans to guide the TSP's growth and development. It analyzes market trends, demand projections, and investment opportunities to ensure the transmission network's expansion aligns with future electricity demands.

### **E. Material Controls**

The Material Controls department oversees the inventory and distribution of materials essential for the maintenance and expansion of the transmission infrastructure. It ensures timely procurement, storage, and proper utilization of materials, minimizing downtime and optimizing operational efficiency.

### **F. Protection, Control, and Metering**

This department is responsible for the effective functioning of the protection and control systems, which are vital for safeguarding the transmission network against faults and



ensuring the efficient power flow. It also manages the metering systems to accurately measure electricity usage and facilitate billing processes.

#### **G. Information, Communication, and Technology (ICT)**

The ICT department supports the TSP's operations by managing the information systems, communication networks, and digital infrastructure. It ensures seamless data exchange, enhances operational efficiency, and strengthens cybersecurity measures.

#### **H. Business Development**

The Business Development department explores new opportunities, partnerships, and ventures to expand the TSP's services and generate revenue. It identifies potential projects, pursues collaborations, and contributes to the growth and diversification of the TSP's business portfolio.

#### **I. Legal Department**

The Legal department ensures compliance with laws, regulations, and industry standards in the power transmission sector. It provides legal counsel on contractual matters, procurement, and project execution to various departments. Additionally, the department is responsible for drafting, reviewing, and managing agreements, contracts, and legal documents related to the TSP's activities and partnerships. In legal matters, negotiations, and dispute resolution processes, the Legal department represents the TSP, safeguarding the organization's interests.

These departments collectively contribute to the TSP's ability to fulfill its role as the Transmission Service Provider, ensuring the reliable and efficient transmission of electricity and promoting the growth and advancement of the power sector.

It is estimated that the supporting departments will be operated based on a budget of 20 billion Naira.

## **14.6 Human Resources**

The TSP effectively fulfills its responsibilities with a team of 2,666 personnel distributed across ten regions of Transmission Company of Nigeria (TCN).

#### **Staff Cost**

The total emolument for the staff amounts to 34 billion Naira at the current conditions. TSP is requesting for a 50% increase in emolument. And a 10% increase every year after the initial 50% increase, this projection is given in [Table 14-3](#).

**Table 14-3: Current and Projected TSP Staff Cost (Billions of Naira)**

2023	2024	2025	2026	2027	2028
34.00	51.00	56.10	61.71	67.88	74.67



## **Administrative Costs**

The TSP will incur several administrative costs as it carries out its critical functions of managing and operating the electricity grid. These administrative costs are essential for maintaining the ISO's operational efficiency, ensuring compliance with regulations, and promoting continuous improvement. Some of the significant administrative costs the TSP will incur include:

### **A. Staff Training and Development**

Investing in staff training and development is crucial to keep the workforce updated with the latest industry practices, technological advancements, and safety protocols. This cost covers workshops, seminars, specialized training programs, and professional certifications for employees across various departments.

### **B. Travel and Conferences**

The TSP may need to attend industry conferences, workshops, and meetings to stay informed about industry trends and best practices. Administrative costs include travel expenses, conference fees, and related accommodations.

### **C. Office Supplies**

Administrative costs also encompass office supplies like stationery, printers, copiers, and other necessary items to support daily administrative activities.

### **D. Medical expenses**

The TSP places utmost importance on ensuring the health and well-being of its staff. TCN as an in-house clinic to provide comprehensive medical services to its employees. The clinic is equipped to address a wide range of medical needs, offering routine check-ups, minor treatments, and primary healthcare services. For medical cases that require specialized care beyond the clinic's capabilities, TCN extends support to its staff by providing access to external medical services. By maintaining the in-house clinic and offering external medical services, the TCN ensures that its staff has access to the appropriate and timely medical care they may need. This approach not only safeguards the health of its employees but also contributes to their overall well-being and productivity.

### **E. Motor Vehicles**

The TSP provides suitable vehicles field related operations. These vehicles are essential for ensuring smooth and timely movement of personnel and necessary equipment to various locations across the electricity grid infrastructure.

### **F. Furniture and Fittings**

The TSP provides suitable furniture and fittings to create a conducive and efficient work environment.

**Table 14-4: General Expense Cost (Billions of Naira)**

Item	2024	2025	2026	2027	2028
General Expense	22.50	25.00	27.50	30.00	32.50



## 14.7 Summary of TSP Costs

The summary of costs for the TSP for year 2024 is presented in [Table 14-5](#). It encapsulates all the expenses mentioned in the preceding sections for year 2024.

[Table 14-5: Summary of TSP Cost for year 2024](#)

Type of Cost	Amount (N billion)
Land Compensation	41.4
Operation and Maintenance	6.08
Expansion Projects	150
Salary and Compensation	51
General Expense	25
<b>Total Cost</b>	<b>273.48</b>



## 15 THE INDEPENDENT SYSTEM OPERATOR RELATED COSTS

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### 15.1 About the ISO

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#### The Independent System Operator

The Independent System Operator (ISO), provides System and Market Operations services in the Nigerian Electricity Market (NEM) as well as System Planning, in line with provisions of the Electricity Act, Grid Code, Market Rules and other extant regulations of the NESI.

As the System Operator (SO), the ISO is responsible for the:

- efficient operations of the power system, coordinating generation and load dispatch on real time to achieve optimal power flow within statutory limits of Voltage and Frequency.
- It is also responsible for Daily Load Forecast/Operations Planning, Long Term Demand Forecast and Expansion Planning as well as enforcement of Grid Code amongst the Grid Users.

As the Market Operations (MO), the ISO is responsible for administration of the wholesale electricity market which includes

- Technical Data Administration,
- Preparation of Market Settlement Statements for energy & capacity,
- Administration of Settlement and payment for Market services as well as
- Implementation and enforcement of the Market Rules amongst the Market Participants.

The ISO carries out this function with a staff strength of 1,364 across 10 regions of TCN with one National Control Center Osogbo.

### 15.2 ISO Projects

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#### Two National Control Centers

Two National Control Center Control buildings are being embarked upon by the ISO at Gwagwalada and Osogbo. The project at New National Control Centre, Gwagwalada, has been awarded at a cost of #1,161,915,489.76. The site was handed over on 20th December 2022; however, works are yet to commence as the contractor awaits Development Control approval. Due to inflation and scope of works review, the estimated project cost may reach #2,633,720,858.49.

The New National Control Centre at Osogbo was awarded at a cost of #1,168,318,636.68. The site was handed over to the contractor on 28th June 2022 but was terminated on 5th December 2022 due to lack of activities on site. The project is currently undergoing a reprourement process with an estimated cost of #2,633,720,000.00.



## Automation/Digitization Tools

The ISO recognizes the importance of automation and digitization in modernizing its processes. The ISO is actively seeking to procure tools that enable automation and digitization. Automation in the context of the ISO refers to the adoption of advanced technologies and software to streamline operational tasks and decision-making processes. By automating various aspects of the power system operation, the ISO aims to enhance efficiency, reduce human errors, and respond rapidly to system demands and disturbances.

Digitization is another crucial aspect that the ISO is keen on embracing. Digitizing data, records, and information enables easy access, storage, and retrieval of critical data. It facilitates real-time monitoring and analysis, leading to informed decision-making and faster response to grid challenges and demands.

The procurement of tools for automation and digitization will empower the ISO to:

1. **Optimize Grid Operations:** Automation will help the ISO in optimizing the dispatch and control of power generation and transmission, ensuring a reliable and stable grid.
2. **Improve System Monitoring:** With digitized data and advanced analytics tools, the ISO can monitor the power system in real-time, identifying issues proactively and taking preventive measures.
3. **Enhance Grid Security:** Automation enables rapid response to security threats, reducing vulnerabilities and safeguarding the power grid from potential cyber-attacks.
4. **Streamline Reporting and Communication:** Digitization allows the ISO to generate comprehensive reports and communicate effectively with stakeholders, enhancing transparency and collaboration.

By embracing automation and digitization, the ISO aims to strengthen its role as a reliable system operator, contributing to the overall stability and growth of the power sector in Nigeria. It aligns with TCN's commitment to modernize and optimize its operations to meet the challenges of the evolving energy landscape.

The automation and digitization tools being sought are given in [Table 15-1](#)

**Table 15-1: Automation/Digitization Tools for the ISO**

S/N	PROJECT TITLE	2024
1	Establishment of well equipped Operational Simulation Centres at the Regional Control Centres	250,000,000
2	Operational Intelligence Tool for System Performance Management	250,000,000
3	Provision, deployment and extension of fibre optic based internet connectivity to CHQ, NCC, 10 Regional Offices, All Sub Regional Offices, all 330KV sub stations, 132KV Sub Stations nationwide; to support and boost ISO operations in NESI market.	437,500,000



4	Provision of physical and virtual backup/storage facilities at CHQ, NCC and 10No Regional Offices .	250,000,000
5	Provision. Deployment and maintenance of digital surveillance equipment including replacement/reinforcement of physical access doors at CHQ, NCC, 10No, Regional Offices nationwide.	187,500,000
6	Extension of LAN and maintenance in CHQ, NCC and 10No. Regional Offices	87,500,000
7	Acquisition and provision of Software suites - Server Operating systems, Client Operating System, Microsoft Office Productivity Tools etc,	218,750,000
8	Systems Development kits, Software upgrades , Subscriptions, Licences acquisitions and renewal and maintenance of existing software solutions	35,000,000
9	ISO data integration & Cloud backup / Provision and maintenance of backup database at CHQ, & NCC Oshogbo.	62,500,000
10	System Operation website and web portals (HR Employee Manager, tcnerm.net, SO dashboard, niggrid.org, SO Grid dispatch, nsong.org, TCN document repository, VIOT/VPN sync DB with nsong; Audit vending software, EVER; ICT Digital Asset software portal etc,) upgrades and maintenance.	22,500,000
11	Provision & reinforcement of cyber security features on all ISO online portals/infrastrucrure governance & Cyber security awareness training	62,500,000
12	Annual subscriptions & maintenance of internet subscriptions and bandwidth for SLA monitoring and compliance software in all 132KV sub stations nationwide ( in all 10No. Operations region and NCC)	125,000,000
13	Hardware maintenance (Servers, Switches, Routers, Digital equipment like printers, copiers, scanners, desktops, laptops, CCTV etc.)	62,500,000
14	Capacibity buiding Onshore & Offshore on Network Administration, Data center Administration, Security Administration & Application Development etc.	187,500,000
15	Extension of ICT infrastructure to proposed Dual National Control Centre at Gwagwalada; including construction of data centre facilities to host SCADA hardware devices and other critical ISO operations among others.	312,500,000
16	Testing and Monitoring Tools for the Market Operator	1,000,000,000
17	Automation of the Market Registration, Market Settlement Processes and Market Analysis Processes	1,000,000,000



18	Annual License Maintenance and upgrade of existing System Planning software and tools (PSS(E ), DIGSilent Power Factory, NEPLAN, ArcGIS Pro) and subscriptions for Cloud services.	80,000,000.00
19	Deployment of Accurate weather forecasting tools and software in readiness for integration of variable renewable energy generation.	300,000,000.00
20	Development of a robust database system for storage and management of power system data and Implementation of a secured platform for internal and external data sharing and collaboration to facilitate efficient data-driven power system planning functions.	350,000,000.00
21	High-performance hardware and servers for power system simulations and data analysis.	50,000,000.00
22	Local/overseas Training and skill development programs for Planning Engineers to stay updated with the latest advancements in power systems studies based on the new emerging technologies and AI for planning and optimization of transmission systems.	200,000,000.00
23	Local/overseas Capacity building for Planning Engineers on ArcGIS visualization and analysis of spatial data related to power system infrastructure and renewable energy resources.	100,000,000.00
24	Consultancy services and experts support in power systems, grid integration studies and forecasting, considering the complexities of demand and supply dynamics using AI and emerging technologies	250,000,000.00
25	Consultancy supports for long term expansion planning and reinforcing the transmission infrastructure to accommodate increased renewable energy capacity integration.	500,000,000.00
26	Consultancy services for Transmission Loss Determination and Reduction studies. This is to scientifically analyse the sources of the losses and conduct feasibility analysis for optimized actions and investment required for the loss reduction.	100,000,000.00
	<b>GRAND TOTAL</b>	<b>6,481,250,000.00</b>

**Telecommunications**

The need for the ISO to upgrade and maintain its telecommunication equipment is essential for ensuring efficient and reliable communication within the organization and with other



stakeholders. Upgrading and maintaining telecommunication equipment play a crucial role in enhancing operational capabilities, improving data exchange, and optimizing system reliability. Projects related to telecommunications in the ISO are given [Table 15-2](#).

**Table 15-2: Telecommunications projects for the ISO**

S/N	PROJECT TITLE	Amount
1	Design, Supply and installation of OPGW in critical transmission lines in critical links in the grid	1,000,000,000
2	Consultancy Services, Upgrade and rehabilitation of OPGW & digital telecommunications systems	490,000,000
4	Provision Telecommunications Measuring Instrument, tools and test kits	350,000,000
6	Provision of outdoor switchyard equipment (wave trap, CVT, LMU and Accessories)	1,000,000,000
7	Emergency preliminary works on the rehabilitation of OPGW and FOTS facilities in the grid	500,000,000
8	Supply and Installation of Battery Banks and Chargers in the grid	350,000,000
10	Installation of Surge Suppressors and Diverters for Telecom equipment	200,000,000
11	Installation of Radio Communication facilities in the following Regions -	120,000,000
12	Provision of Telecoms Equipment spares for SDH, PLC, Microwave Radio, Multiplexer	450,000,000
13	Provision of 4no. Toyota Hilux maintenance Vehicle for Telecoms Engineers in the Operation Region	210,000,000
14	Hands on training & Project Management training for telecommunication engineers	90,000,000
15	Provision of Distance Protection Signalling for telecoms equipment	120,000,000
16	Digital Communication for new substations	800,000,000
17	Rehabilitation and Maintenance of OPGW and FOTS facilities in the grid	350,000,000



18	Rehabilitation & Maintenance of Voice & Data communication services to NCC and rest of the grid for new and existing Substations in TCN network	160,000,000
19	Provision & deployment of grid telecoms interoperability scheme for multi-vendor telecoms equipment	120,000,000
20	Provision of wave traps and Line Matching units for grid	280,000,000
21	Provision of new / Reactivation and Extension of existing SDH signal to stations in the grid	140,000,000
22	Rehabilitation and ancillary works on Digital Communications equipment	150,000,000
23	Development of grid telecoms schematic layout with GPS equipment location	75,000,000
24	Supply and Installation of 50V Battery Banks and chargers for telecoms equipment in the grid	300,000,000
<b>TOTAL</b>		<b>7,255,000,000</b>

### Operation and Maintenance projects for the ISO

The ISO regularly engages in operations and maintenance activities to ensure the reliable and efficient operation of the power transmission system. These activities involve routine inspections, maintenance, and repairs of critical equipment and infrastructure, as well as continuous monitoring and control of the power grid.

To support these essential operations and maintenance activities, adequate funding is required.

Table 15-3: Operation and Maintenance projects for the ISO

#	Project	NGN
1	Maintenance of Digital Grid Frequency Meters Nationwide	10,000,000
2	Upgrade and Maintenance of Outages Management and Data Logging Technology	10,000,000
3	Maintenance and Fueling of 10No. All Terrain Vehicle (ATV) for inspection and isolation within larger switch-yards	5,000,000
4	Consultancy Services on Generation Schedule, Economic Dispatch, Regulatory & Security Constrained Economic Dispatch (SCED) Softwares	10,000,000
5	Bi-Annual ISO-NESI Stakeholders Rountable Meeting	220,000,000



6	SO Discourse Meeting	50,000,000
7	Grid Network Single Line Diagram (SLD) Update and Corrections	10,000,000
8	Mobile Communicatiion Close User Group Subscription Fees	50,000,000
9	Annual Subscription/ Professional license fees for System Operators	100,000,000
10	Stakeholders Operational Planning Forum	50,000,000
11	Clearing and Maintenance of all 330kV and 132kV Switchyards across the network.	1,200,000,000
12	Maintenance of 330kV and 132kV Control Room Building fixtures and fittings	1,500,000,000
13	Operations Working Group Meetings	270,000,000
14	Publication of Required Statutory Reports	30,000,000
15	Grid Code Review Panel	80,000,000
16	Procurement, Installation and Maintenance of Airconditioners and accessories for control rooms across the network.	150,000,000
17	Duty Tours and Travels	170,000,000
18	Consultancy Services on Compliance and Operational Audit	200,000,000
19	Consultancy Services on System Underfrequency Load Shedding Scheme.	150,000,000
20	Refurbishment Audits on the existing Transmission System in order to determine the remaining useful life of the Transmission System Components	60,000,000
21	Overseas Skills Acquisition Programs for SO Engineers on Grid Automation and control.	150,000,000
22	Overseas Skills Acquisition Programs for SO Engineers on Grid Stability & Reliability Studies and analysis	150,000,000
23	Specialist Training on Database Creation, Storage & Archiving Mgt. for Planning and SO Engrs.( In accordance with Grid code)	140,000,000



24	COORDINATION / MONITORING	65,000,000.00
25	Management/Sub- Sectoral Retreat/Workshops	250,000,000.00
26	Nigeria Electricity Supply Industry (NESI) sensitisation tours	75,000,000.00
27	Consultancy Services	250,000,000.00
28	Annual End of Year Merit Award	100,000,000.00
29	Provision of Maintenance and support tools, Annual licence Subscription/ cloud hosting for the corporate Planning Monitoring software and tools	60,000,000.00
30	Specialized capacity development programme for monitoring and evaluation/ data analytical tools and related technology for effective performance in corporate planning.	90,000,000.00
31	Design, development and installation of smart technologies for data analytics and process improvement in ISO	85,000,000.00
	<b>TOTAL</b>	<b>5,740,000,000</b>

## 15.3 Human Resources

The ISO effectively fulfills its responsibilities with a team of 1,364 personnel distributed across ten regions of Transmission Company of Nigeria (TCN), with its primary National Control Center located in Osogbo. The ISO's organizational structure includes several functional departments, each essential in ensuring the efficient and reliable operation of the power transmission system. These departments are as follows: System Planning, Grid Operations/Control, Technical Services (covering Communications & SCADA), System Operations, , System Performance, Transactional Data Processing, System Performance, Technical Data Administration, Market Settlement, Market Development, Market Performance and Analysis, Human Resources and Corporate Planning.

The synergy between these functional departments allows the ISO to deliver its mandated services. The dedicated staff members across various departments play a crucial role in upholding the ISO's mission as a reliable and competent system operator in the power industry.

### Staff Cost



The total emolument for the staff amounts to 26 billion Naira at the current conditions. The ISO is requesting for a 50% increase in emolument. And a 10% increase every year after the initial 50% increase, this projection is given [Table 15-4](#).

**Table 15-4: Current and Projected ISO Staff Cost (Billions of Naira)**

2023	2024	2025	2026	2027	2028
31.25	39.00	42.90	47.19	51.91	57.10

### **Administrative Costs**

The ISO will incur several administrative costs as it carries out its critical functions of managing and operating the electricity grid. These administrative costs are essential for maintaining the ISO's operational efficiency, ensuring compliance with regulations, and promoting continuous improvement. Some of the significant administrative costs the ISO will incur include:

#### **A. Staff Training and Development**

Investing in staff training and development is crucial to keep the workforce updated with the latest industry practices, technological advancements, and safety protocols. This cost covers workshops, seminars, specialized training programs, and professional certifications for employees across various departments.

#### **B. Travel and Conferences**

The ISO may need to attend industry conferences, workshops, and meetings to stay informed about industry trends and best practices. Administrative costs include travel expenses, conference fees, and related accommodations.

#### **C. Office Supplies**

Administrative costs also encompass office supplies like stationery, printers, copiers, and other necessary items to support daily administrative activities.

#### **D. Medical expenses**

The ISO places utmost importance on ensuring the health and well-being of its staff. TCN as an in-house clinic to provide comprehensive medical services to its employees. The clinic is equipped to address a wide range of medical needs, offering routine check-ups, minor treatments, and primary healthcare services. For medical cases that require specialized care beyond the clinic's capabilities. TCN extends support to its staff by providing access to external medical services. By maintaining the in-house clinic and offering external medical services, the TCN ensures that its staff has access to the appropriate and timely medical care they may need. This approach not only safeguards the health of its employees but also contributes to their overall well-being and productivity.

#### **E. Motor Vehicles**

The ISO provides suitable vehicles field related operations. These vehicles are essential for ensuring smooth and timely movement of personnel and necessary equipment to various locations across the electricity grid infrastructure.



## F. Furniture and Fittings

The ISO provides suitable furniture and fittings to create a conducive and efficient work environment.

Table 15-5: General Expense Cost (Billions of Naira)

Item	2024	2025	2026	2027	2028
General Expense	10.50	13.00	15.00	17.50	20.00

## 15.4 Summary of ISO Costs

The summary of costs for the ISO is presented in Table 15-6. It encapsulates all the expenses mentioned in the preceding sections for year 2024.

Table 15-6: Summary of ISO Cost for year 2024

Type of Cost	Amount (N billion)
National Control Center	5.00
Automation/Digitization Tools for the ISO	6.48
Telecommunication Tools	7.25
Operation and Maintenance	5.74
Salary and Compensation	39.00
General Expense	10.5
<b>Total Cost</b>	<b>73.97</b>



## 16 APPENDIX

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### 16.1 Meeting with Abuja Disco

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**Date:** February 8, 2023

**Time:** 9.00am

**Location:** TCN Corporate Headquarters

**Attendees:**

1. Engr. Kabiru M. Adamu	TCN
2. Engr. A.G. Adamu	TCN
3. Engr. Bashir Abdulmumini	TCN
4. Engr. Seun Amoda	TCN
5. Engr. Samantha Goewam	TCN
6. Engr. Umar Hassan	TCN
7. Mr. Gregory Ifeanyi	TCN
8. Engr. Kassim A. Burkullu	AEDC
9. Engr. Taofeeq Kola Rufai	AEDC
10. Engr. Okolo Jude	AEDC
11. Engr. Lami Maji	AEDC
12. Mr. Ademola Olaopa	PwC

**Pictures**





# 16.2 Meeting with Benin Disco

**Date:** January 30, 2023

**Time:** 1.00 pm

**Location:** PWC Experience Centre, Oniru, Lagos

**Attendees:**

1. Engr. Kabiru M. Adamu	TCN
2. Engr. A.G. Adamu	TCN
3. Engr. Seun Amoda	TCN
4. Engr. Bashir Abdulmumini	TCN
5. Engr. Samantha Goewam	TCN
6. Engr. Seth Elefetah	BEDC
7. Chizim Owhor	BEDC
8. Ademola Olaopa	PWC





## 16.3 Meeting with Eko Disco

**Date:** January 31, 2023

**Time:** 1.00 pm

**Location:** PWC Experience Centre, Oniru, Lagos

### Attendees:

1. Engr. Kabiru M. Adamu	TCN
2. Engr. A.G. Adamu	TCN
3. Engr. Seun Amoda	TCN
4. Engr. Bashir Abdulmumini	TCN
5. Engr. Samantha Goewam	TCN
6. Engr. Umar Hassan	TCN
7. Engr. Femi Olaoye	EKEDC
8. Engr. O. Okpo	EKEDC
9. Engr. Ovie Adjekpiyede	EKEDC
10. Ademola Olaopa	PWC

### Pictures





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## 16.4 Meeting with Enugu Disco

**Date:** February 1, 2023

**Time:** 9.00 am

**Location:** PWC Experience Centre, Oniru, Lagos

**Attendees:**

1. Engr. Kabiru M. Adamu	TCN
2. Engr. A.G. Adamu	TCN
3. Engr. Seun Amoda	TCN
4. Engr. Bashir Abdulmumini	TCN
5. Engr. Samantha Goewam	TCN
6. Engr. Umar Hassan	TCN
7. Engr. Vincent Ekwewu	EEDC
8. Engr. Stanley Onwuzurike	EEDC
9. Ademola Olaopa	PWC

**Pictures**





DRAFT



## 16.5 Meeting with Ibadan Disco

**Date:** January 31, 2023

**Time:** 9.00 am

**Location:** PWC Experience Centre, Oniru, Lagos

**Attendees:**

1. Engr. Kabiru M. Adamu	TCN
2. Engr. A.G. Adamu	TCN
3. Engr. Seun Amoda	TCN
4. Engr. Bashir Abdulmumini	TCN
5. Engr. Samantha Goewam	TCN
6. Engr. Umar Hassan	TCN
7. Engr. Femi Olaoye	EKEDC
8. Engr. O. Okpo	EKEDC
9. Engr. Ovie Adjekpiyede	EKEDC
10. Ademola Olaopa	PWC

**Pictures**



## 16.6 Meeting with Ikeja Disco

**Date:** February 1, 2023

**Time:** 1.00 pm

**Location:** PWC Experience Centre, Oniru, Lagos

### **Attendees:**

1. Engr. Kabiru M. Adamu	TCN
2. Engr. Akintola M.A.	TCN
3. Engr. A.G. Adamu	TCN
4. Engr. Bashir Abdulmumini	TCN
5. Engr. Seun Amoda	TCN
6. Engr. Samantha Goewam	TCN
7. Engr. Umar Hassan	TCN
8. Engr. Olajide Kumapayi	IKEDC
9. Engr. Shittu Sulaimon	IKEDC
10. Engr. Olatayo Olalere	IKEDC
11. Engr. Olaode Daramola	IKEDC
12. Ademola Olaopa	PWC

### **Pictures**





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## 16.7 Meeting with Jos Disco

**Date:** February 8, 2023

**Time:** 1.00 pm

**Location:** TCN Corporate Headquarters, Abuja

### **Attendees:**

1. Engr. Kabiru M. Adamu	TCN
2. Engr. A.G. Adamu	TCN
3. Engr. Bashir Abdulmumini	TCN
4. Engr. Seun Amoda	TCN
5. Engr. Samantha Goewam	TCN
6. Engr. Umar Hassan	TCN
7. Mr. Gregory Ifeanyi	TCN
8. Engr. Hamisu Jigawa	JEDC
9. Mr. Ademola Olaopa	PwC

### **Pictures**



# 16.8 Meeting with Kaduna Disco

**Date:** February X, 2023

**Time:** 9.00 am

**Location:** TCN Corporate Headquarters, Abuja

**Attendees:**

1. Engr. Kabiru M. Adamu	TCN
2. Engr. A.G. Adamu	TCN
3. Engr. Bashir Abdulmumini	TCN
4. Engr. Samantha Goewam	TCN
5. Mr. Gregory Ifeanyi	TCN
6. Engr. A.M. Lawal	KAEDC
7. Engr. Isah Ahmed	KAEDC
8. Ademola Olaopa	PwC

**Pictures**





DRAFT



## 16.9 Meeting with Kano Disco

**Date:** February 2, 2023

**Time:** 1.00 pm

**Location:** PWC Experience Centre, Oniru, Lagos

### **Attendees:**

1. Engr. Kabiru M. Adamu	TCN
2. Engr. A.G. Adamu	TCN
3. Engr. Bashir Abdulmumini	TCN
4. Engr. Seun Amoda	TCN
5. Engr. Samantha Goewam	TCN
6. Engr. Umar Hassan	TCN
7. Engr. I.B. Daneji	KEDCO
8. Engr. Shuaibu A. Adeiza	KEDCO
9. Ademola Olaopa	PwC

### **Pictures**



# 16.10 Meeting with Port Harcourt Disco

**Date:** January 30, 2023

**Time:** 9.00 am

**Location:** PWC Experience Centre, Oniru, Lagos

**Attendees:**

1. Engr. Kabiru M. Adamu	TCN
2. Engr. A.G. Adamu	TCN
3. Engr. Seun Amoda	TCN
4. Engr. Bashir Abdulmumini	TCN
5. Engr. Samantha Goewam	TCN
6. Engr. Thomas Otonye	PHED
7. Chukwudi Adeshina	PHED
8. Ademola Olaopa	PwC

**Pictures**





DRAFT

# 16.11 Meeting with Yola Disco

**Date:** February 2, 2023

**Time:** 9.00 am

**Location:** PWC Experience Centre, Oniru, Lagos

**Attendees:**

1. Engr. Kabiru M. Adamu	TCN
2. Engr. A.G. Adamu	TCN
3. Engr. Bashir Abdulmumini	TCN
4. Engr. Seun Amoda	TCN
5. Engr. Samantha Goewam	TCN
6. Engr. Umar Hassan	TCN
7. Engr. Bello Babayo	YEDC
8. Nura Wadanzy	YEDC
9. Ademola Olaopa	PwC

**Pictures**



