



# WORKSHOP

# UTILITY DIGITALIZATION AND PERFORMANCE IMPROVEMENT IN AFRICA

*February 12-14, 2024*

*Cape Town, South Africa*

Globally, digital transformation of the power system is fundamentally changing utility operations. Utilities around the world are increasingly deploying digital technologies to improve operational efficiency, automate processes, and manage increasing amount of renewable energy and distributed energy resources.

In sub-Saharan Africa, utilities face some key challenges such as high costs, unreliable power supply, high energy losses, and a substantial electricity access deficit that constrains human development outcomes and economic growth. Even while these legacy challenges persist, there are emerging operational challenges from the energy transition related to the growing amounts of variable renewable energy on the grid, electrification of end uses, including electric mobility. Digital technologies can help address these challenges and also open new opportunities. Numerous utilities across the continent have been adopting smart grid infrastructure (such as smart metering, OMS, DMS) and Information Technology systems (ERP, CMS, etc.) to improve operational efficiency, customer satisfaction, system reliability, and streamline main business processes. Some utilities have started piloting digital tools and technologies, such as advanced data analytics, artificial intelligence, digital twins, peer-to-peer trading.

The World Bank's Energy Sector Management Assistance Program (ESMAP) has designed a **3-Day Training Workshop** in collaboration with the India Smart Grid Forum on **Utility Digitalization and Performance Improvement in Africa**.

The workshop will cover the role of digital tools and platforms for performance improvement and to address the challenges of energy transition in Sub-Saharan Africa.

The workshop will bring together global experts and utility practitioners, to discuss key trends in digital transformation of power utilities and the foundational technologies it entails, to present insights on challenges and enablers, implementation roadmaps and strategies, as well as successful and practical case studies from utilities worldwide.

The participants of the workshop will gain insights on the role of digitalization in grid modernization and improved utility operations, foundational technologies for grid automation and digitalization, IT architecture, data management, cloud services and cyber security, utility performance landscape in Sub-Saharan Africa, communication technologies for utility automation and smart metering, emerging immersive technologies for the power sector, and more.

The workshop will provide a platform for sharing experiences and best practices, facilitating knowledge exchange amongst utility practitioners and peers from the region.

## **LEARNING OUTCOMES**

- Gain insights on the role digital technologies can play in addressing challenges utilities are facing and emerging opportunities.
- Learn the nuances of digital technologies and implementation challenges with case studies of a broad range of projects from both developed and developing countries.
- Learn the basic considerations on how to build digitalization roadmaps and formulate programs and projects in their respective utilities.
- Network with peers from Sub-Saharan African utilities and global experts, knowledge exchange and sharing of insights and best practices and interactive learning sessions and demonstration sessions.

## **TARGET AUDIENCE**

- Employees of electric utility companies and grid operators in Sub-Saharan Africa, responsible for investment planning, commercial operations, IT systems.
- Government officials, policymakers, and regulatory authorities involved in shaping energy policies, regulations, and strategies for the digitalization of the energy sector in Sub-Saharan Africa.

# AGENDA



MONDAY, FEBRUARY 12, 2024

Time	Session Description	Speakers
8-8:30am	Welcome Tea/Coffee	
8:30-8:40am	Workshop Opening by World Bank	<b>Erik Magnus Fernstrom</b> Practice Manager, East Africa Energy Department, World Bank
8:40-8:50am	Remarks by the Association of Power Utilities of Africa (APUA)	<b>Abel Tella</b> Director General, APUA
8:50-9am	Remarks by India Smart Grid Forum (ISGF)	<b>Reena Suri</b> Executive Director
9-10:30am	<p><b>Session 1   The Role of Digitalization in Grid Modernization and Utility Performance Improvement</b></p> <p><i>Expert Presentations and Q&amp;A</i></p> <p>This session will delve into what digitalization is, the difference with digitization, how digital technologies are at the forefront of transforming traditional electric utilities into smart, efficient, and sustainable utilities. It will highlight strategy and roadmaps for digitalization, challenges related to digitalization, its facilitators, and business cases. It will include relevant examples from utilities worldwide, as well as three specific case studies on how digitalization improves utility performance for energy transition. The session will also briefly cover the challenges posed to utilities in the integration of distributed energy resources (DER) and electric vehicles (EVs).</p>	<p><b>Reji Kumar Pillai</b> President, ISGF</p> <p><b>Ravi Seethapathy</b> ISGF Advisor</p>
10:30-11am	Tea/Coffee Break	
11am-12:30pm	<p><b>Case Study Session 1   Digital Transformation, Utility Performance, and the Energy Transition</b></p> <p><i>Moderated and Interactive Session with Utilities</i></p> <p><b>Moderator: Ravi Seethapathy, ISGF Advisor</b></p> <p><b>Panelists:</b></p> <ol style="list-style-type: none"> <li><b>Subhadip Raychaudhuri</b>, Tata Power, India</li> <li><b>Rodrigo Maldonado Iturrieta</b>, Enel, Chile</li> <li><b>Nick Singh</b>, ESKOM, South Africa</li> <li><b>Moustaph Baidy Ba</b>, SENELEC, Senegal</li> </ol>	
12:30-1:30pm	LUNCH	

Time	Session Description	Speakers
1:30-2:45pm	<p><b>Session 2   Foundational Technologies for Grid Automation and Digitalization</b></p> <p><i>Expert Presentations and Q&amp;A</i></p> <p>This session will cover fundamental operation technologies (OT) adopted by utilities such as SCADA, EMS, DMS, ADMS, GIS, DA/SA, AMI, WAMS, Robotics, DERMS. It will then cover Enterprise IT Systems, such as ERP, OMS, FFA, Robotic Process Automation (RPA), and others. It will finally touch upon Call Centre Automation.</p>	<p><b>Ravi Seethapathy</b> ISGF Advisor</p> <p><b>Subhadip Raychaudhuri</b> Head-Engineering, Energy Audit, GIS &amp; AMI Applications, TATA Power</p> <p><b>Brajanath Dey</b> Head of Group Network Engineering-I &amp; HT New Connections, TATA Power</p>
2:45-3:45pm	<p><b>Session 3   IT Architecture, Data Management, Cloud Services and Cyber Security</b></p> <p><i>Expert Presentations and Q&amp;A:</i></p> <p>This session will emphasize the importance of state of the art (SOTA) IT Systems with Service Oriented Architecture (SOA) that are scalable. The session will also cover the criteria for sizing and choosing appropriate cloud systems and services, data security, and management frameworks. It will focus also on cyber security issues and cyber security survey for utilities in Africa.</p>	<p><b>Reji Kumar Pillai</b> President, ISGF</p> <p><b>Barry MacColl</b> Senior Regional Manager, EPRI</p> <p><b>Alexis Rechain</b> Managing Director, Stratec-Arc</p>
3:45-4pm	<b>Tea/Coffee Break</b>	
4-4:45pm	<p><b>Session 4   Communication Technologies for Utility Operations</b></p> <p><i>Expert Presentation and Q&amp;A</i></p> <p>This session will discuss communication technology options for utilities for various IT and OT systems; and present criteria for selection of appropriate communication solutions for different utility applications.</p>	<p><b>Barry MacColl</b> Senior Regional Manager, EPRI</p>
4:45-5:45pm	<p><b>Case Study 2   Utilities Modernization Experience in SSA</b></p> <p><i>Moderated and Interactive Session with Utilities from Sub-Saharan Africa (SSA)</i></p> <p><b>Moderator: Abel Tella, Director General, APUA</b></p> <p><b>Panelists:</b></p> <ol style="list-style-type: none"> <li>1. <b>Cleophas Ogutu</b>, Kenya Power, Kenya</li> <li>2. <b>Alex Atukunda</b>, Umeme, Uganda</li> <li>3. <b>Vincent Kouakou Yao</b>, CIE (GS2E), Cote d'Ivoire (<i>virtual</i>)</li> <li>4. <b>Edson Comatiporte</b>, EDM, Mozambique</li> </ol>	
<b>END OF DAY 1</b>		



# AGENDA

## TUESDAY, FEBRUARY 13, 2024

Time	Session Description	Speakers
8-8:30am	<b>Tea/Coffee and Recap of Day 1</b>	
8:30-9:15am	<p><b>Session 5   Utility Performance Landscape in Sub-Saharan Africa</b></p> <p><i>Expert Presentation and Q&amp;A:</i> The session will cover how the use of digital technologies can help to optimize service to customers and improve efficiency, transparency, and accountability in operations in key business areas of an electric utility (electricity supply, commercial functions, management of corporate resources, etc.). Analysis of options to optimize execution of processes and activities (P&amp;A) in each business area with the support of digital technologies.</p>	<p><b>Pedro Antmann</b> Sr. Expert, World Bank</p>
9:15-10:45am	<p><b>Session 6   Smart Metering</b></p> <p><i>Expert Presentations and Q&amp;As:</i> The session will cover in detail, the Smart Metering or Advanced Metering Infrastructure (AMI) which is the essential step towards digitalization of utilities. Besides energy accounting and loss identification, the AMI data can be analyzed with advanced digital tools to help accurate demand forecasting in different time intervals in a day/week/season that will help reducing power purchase cost; optimize network assets and operations, faster outage detection and service restoration, remote operations; accurate measurement of reliability indices; and power quality measurement and management. The session will present smart metering implemented at Tata Power Delhi Distribution Ltd, as well as AMI deployment at Eskom.</p>	<p><b>Subhadip Raychaudhuri</b> Head- Engineering, Energy Audit, GIS &amp; AMI Applications, TATA Power</p> <p><b>Reji Kumar Pillai</b> President, ISGF</p> <p><b>Nick Singh</b> Head of Smart Grids Centre of Excellence &amp; Microgrids Programme Director, ESKOM</p>
10:45-11am	<b>Coffee/Tea Break</b>	

TUESDAY, FEBRUARY 13, 2024

11am-12:30pm	<p><b>Session -7: DER Management and Prosumer Enablement</b></p> <p><i>Expert Presentations and Q&amp;As:</i></p> <p>This session will primarily discuss the impact of distributed energy resources (DER) on the grid and the solutions for DER integration with grid such as battery energy storage systems (BESS), demand response (DR) and other digital tools and platforms. The session will also cover consumer/prosumer engagement in management of DERs which include demand side interventions which is facilitated through digitalization as well as how digitalization empowers consumers with real-time data on their energy consumption, enabling them to make informed choices and reduce energy bills; and prosumer – utility engagement models. The speakers will present examples of successful projects and pilot demonstrations.</p>	<p><b>Ravi Seethapathy</b> ISGF Advisor</p> <p><b>Reena Suri</b> Executive Director, ISGF</p> <p><b>Reji Kumar Pillai</b> President, ISGF</p>
12:30-1:30pm	<b>LUNCH</b>	
2:30-6pm	<p><b>Site Visit to Eskom’s First Smart Embedded PV with Battery Storage Microgrid Pilot Project at Lyndoch</b></p> <p>Lyndoch is a small community located on the outskirts of Stellenbosch and has a diverse mix of sustainable and environmentally friendly building styles and living. In 2017 Eskom added to this sustainability by piloting Rooftop PV with battery storage including smart metering to this community. This demonstration project, co-owned by Eskom and the community, empowered community members to assume active roles in the development, installation, maintenance, and ownership of the energy system. Through this and other sites, Eskom is testing microgrids as a solution to supplying green power where there are constrained networks, in rural and remote areas, to improve reliability, or as an alternative to avoid costly infrastructure.</p>	<p><b>Nick Singh</b> Head of Smart Grids Centre of Excellence &amp; Microgrids Programme Director, ESKOM</p>
6:30-8:30pm	<p><b>Networking Reception</b> Asara Wine Estate Polkadraai Road, Stellenbosch, 7600, Cape Town</p>	
<b>END OF DAY 2</b>		

# Site Visit to Eskom's Pilot Rooftop PV with Battery Storage Microgrid | February 13, 2024



**Location:** Lynedoch in Stellenbosch | <https://g.co/kgs/PmRjhoS>

## About the site

Lynedoch is a small community located on the outskirts of Stellenbosch with a diverse mix of sustainable and environmentally friendly building styles and living. In 2017, with the hope of demonstrating how a power utility might reap benefits from future customers and make the switch to a cleaner production, generation, and delivery of electricity, Eskom embedded a pilot Rooftop PV with Battery storage scheme which included smart metering throughout this community. The result: the pilot has successfully demonstrated the role renewable energy can play in this sector. In Partnership with Smarts Grids Centre of Excellence & Microgrids Programme, the visit will include a walk through showcasing the pilot. For more information, read the abstract.

**Duration of the visit:** 30-45 minutes on site.

**Departure time from CTICC @ 2:30pm sharp.**

**Mode of transportation:** By bus.

**Next activity:** Reception at a nearby winery (either Spier or Asara Wine Estate) TBC.

## Local Contact

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# AGENDA

**DAY 3**

**WEDNESDAY, FEBRUARY 14, 2024**

Time	Session Description	Speakers
8:30-9am	<b>Coffee and Recap of Days 1 and 2</b>	
9-10am	<p><b>Case Study 3   Strategic Approaches on Data Driven Transformation of Utilities and Selected Case Studies</b></p> <p><i>Expert Presentation and Q&amp;A:</i> The session will cover components of data-driven transformation, benefits and challenges, role of digitalization in addressing the real-life challenges of utilities; guiding principles for data-driven roadmaps, and utility case study from Turkey.</p>	<p><b>Gökhan Tosun</b> Director - Technology and Smart Energy, MRC Turkey</p>
10-10:30am	<b>Coffee/Tea Break</b>	
10:30-11:30am	<p><b>Session 8   Roadmaps and Implementation Strategies</b></p> <p><i>Expert Presentations and Q&amp;A:</i> The session will discuss the long-term corporate plan, smart grid roadmap, digitalization roadmap and IT roadmap etc. The session will also cover Smart Grid Maturity Model (SGMM), as well as a presentation of the Smart Grid Roadmap of City of Cape Town.</p>	<p><b>Gokhan Tosun</b> Director - Technology and Smart Energy, MRC Turkey</p> <p><b>Rebecca Cameron</b> Principle Professional Officer, Sustainable Energy Markets Department, CoCT</p> <p><b>Gerhard Brown</b> Principal Engineer, CoCT</p>
11:30 ~ 13:00	<p><b>Session 9   Emerging Technologies and Use Cases</b></p> <p><i>Format: Expert Presentation and Q&amp;A:</i> This session will examine the impact of fast paced growth of electric vehicles (EVs) for electric utilities as well as the new technologies such as Artificial Intelligence (AI), Machine Learning (ML), Data Science and Advanced Analytics and its successful use cases in utilities and the implementation challenges.</p>	<p><b>Reji Kumar Pillai</b> President, ISGF</p> <p><b>Renier van Rooyen</b> Chief Engineer Smart Grids, ESKOM</p>
1-2pm	<b>LUNCH</b>	
2-3pm	<p><b>Session -10: Business Models</b></p> <p><i>Expert Presentation and Q&amp;A:</i> This session will explore innovative business models to implement new technologies that reduce the risk of utilities and help them maintain the digital systems at minimal cost. The session will also cover frameworks to conduct successful pilots/demonstration projects; and models for scaling up the pilot projects.</p>	<p><b>Reji Kumar Pillai</b> President, ISGF</p> <p><b>Gokhan Tosun</b> Director - Technology and Smart Energy, MRC Turkey</p> <p><b>Nick Singh</b> Head of Smart Grids Centre of Excellence &amp; Microgrids Programme Director, ESKOM</p>



# AGENDA

Time	Session Description	Speakers
3-4pm	<p><b>Case Study 4   Case Study on Utility Digitalization Journey</b></p> <p><i>Presentation by <b>Rodrigo Maldonado</b>, ENEL Chile:</i></p> <p>The session will cover ENEL Chile's experiences in grid modernization and digitalization in Distribution. It will be reviewed how significant quality improvement indicators were achieved by applying a comprehensive strategy that addressed the incorporation of technology, software, analysis methodologies, process efficiency and cultural change. The experience of Smart Meter implementation will also be shared, describing the problems of the process including communication problems with the customers, regulatory changes and the covid pandemic, and how they were resolved and, in some cases, taken as opportunities. Additionally, the challenges of preparing the Distribution Utility for growing customer demand will be presented, balancing the anticipation investments with having an efficient grid. This task becomes more complex with the emergence of Distributed Generation and electromobility.</p>	
4-4:30pm	<p><b>COFFEE/TEA BREAK</b></p>	
4:30-5:30pm	<p><b>Session 11   Training and Capacity Building in Utilities and Industry</b></p> <p><i>Moderated Panel with Short Presentations and Q&amp;A:</i></p> <p>This session will cover the key factors that would determine the success of digitalization in a utility including the capability of its employees in understanding the nuances of the new technologies and their willingness to adapt to the digital era. Establishment of Centre of Excellence (CoE) for new technologies in a utility/country/region can significantly contribute to the pace and success of such transformation. It is also important to work towards gender balance and women's inclusion in employment opportunities in utilities.</p> <p><b>Moderator: Barbara Ungari, World Bank</b></p> <p><b>Panelists:</b></p> <ol style="list-style-type: none"> <li>1. <b>Reena Suri</b>, ISGF</li> <li>2. <b>Subhadip Raychaudhuri</b>, Tata Power</li> <li>3. <b>Abel Tella</b>, APUA</li> <li>4. <b>Nick Singh</b>, Eskom</li> </ol>	
<p><b>END OF DAY 3</b></p>		