



WORKSHOP ON NON-DISPATCHABLE RENEWABLE ENERGIES INTEGRATION INTO THE GRID

AGENDA

Hotel Protea Arcades
Lusaka, Zambia
September 5th & 6th, 2018



Day 1 – Wednesday September 5th

Morning session

8.00 Registration of participants

8.30 Introduction and objectives of the workshop

Fidelis Mubiana – Acting Managing Director, ZESCO

Luca Marena - RES4Africa Project Manager

H.E. Amb. Filippo Scammacca del Murgio – Ambassador of Italy in Zambia

Hon. Matthew Nkhuwa – Cabinet Secretary, Ministry of Energy

9:00 The challenges of Transmission System Operator (TSO) to manage the variability of renewable generation

- Problems related to Non Dispatchable Renewable Generation
- Lesson Learned from Italian VRE development process

Francesco Rizzo - Africa Area Manager, CESI

11:00 Coffee break

11:30 Equipment in the PV plant for an optimal grid management

- Frequency and voltage control actuated by the PV plant operator
- Signals exchanged between TSO and PV plant operator

Tshepo Tshivhasa – Grid Connection Unit, Enel Green Power

13:00 Lunch break

Afternoon session

14:00 Tools and best practices for operation in system with non-dispatchable renewable sources

- Evaluation of Reserve Margin in presence of variable renewable generation
- Dynamic Security Assessment
- Wide Area Measurement System (WAMS)
- Dynamic Rating
- Synthetic Inertia

Francesco Rizzo - Africa Area Manager, CESI

15:30 Defence and Restoration Plan in presence of variable renewable generation

- Objectives of Defense & Restoration Plans
- Defense & Restoration Plans & Practices in Italy
- Case Studies from other TSOs
- Critical Aspects to be considered in presence of large amount of VRE

Francesco Rizzo - Africa Area Manager, CESI

17:00 Closing

Day 2 – Thursday September 6th

Morning session

8.00 Registration of participants

8:30 Regulatory framework: Incentives for RES deployment

- Reforms to allow RES deployment
- Various incentives schemes
- Auctions vs Feed-In Tariffs
- Two case studies: Zambia and South Africa

Boitumelo Kiepile – Head of Regulatory Affairs Sub-Saharan Africa, Enel Green Power

09:45 Energy Management Development

- RES impact on grid management
- Dispatching and forecasting issues for RES
- Lesson learned: Italy, South Africa and Australia

Guido Caporilli Razza – Global Commercial Office, Enel Green Power

11:00 *Coffee break*

11:30 Storage systems for the integration of RES generation into power systems

- *How Storage systems can support the grid in Renewables growth*
- *Applications for Storage coupled with Renewables*
- *A snapshot of the experience over the world*

Eleonora Petrarca – Head of Business Development Energy Storage, Enel Green Power

13:00 Lunch break



Afternoon session

14:30 New frontiers for grid management: the TSO perspective

- Demand Side response
- Virtual Power Plant
- Services Aggregation
- Regulatory framework

Matteo Neri - International Business Development, TERNA

16:30 Closing



WHO WE ARE

RES4AFRICA

Renewable Energy Solutions for Africa - RES4Africa - is a network of key international energy stakeholders - utilities, industries, agencies, technical service providers and academia - engaged in promoting clean tech solutions in the Sub-Saharan African continent. Its mission is to support the deployment of renewable energy, both large scale and distributed energy, energy efficiency solutions and their integration in the local and regional markets to satisfy local energy needs. RES4Africa encourages the set-up of partnership formulas to provide decision makers with the viewpoint of the private sector and to stimulate investment opportunities along the entire supply chain through networking activities for market operators, industry associations and other key stakeholders

RES4Africa aims to create an enabling environment for renewable energy investments in Sub-Saharan African countries by:

1. Acting as a **connecting platform for dialogue & strategic partnerships** between members and partners to exchange perspectives and foster cooperation;
2. Providing **technical support & market intelligence** through dedicated studies and recommendations based on members' know-how to advance RE markets;
3. Leading **capacity building, training and innovation** efforts based on members' expertise to enable skills and knowledge transfer that support long-term RE market creation;

The three strategic work streams focus on the most relevant themes, from financing and business models, to policy and regulation, socio-economic development and technical feasibility, innovation and sustainability.

Luca Marena

Luca Marena, born in 1977, graduated in Mechanical Engineering in 2000, completed his university education with a master in Project Financing.

Luca started his working experience in the Oil & Gas industry (ExxonMobil) and in the EPC sector (Technip). Luca joined Enel in 2006, as a Project Engineer in the Engineering and Construction Unit. In 2016, he was seconded in the Association RES4MED & Africa, as a Senior Project Manager in charge of the launch of RES4Africa Program in the Sub-Saharan Africa countries.

CESI – CENTRO ELETTROTECNICO SPERIMENTALE ITALIANO

CESI is an independent center of expertise and a global provider of technical and engineering services to customers throughout the energy value chain, including business and technical consultancy, engineering and operational support. CESI also act as owner's engineer and provide qualified third-party opinions to power utilities worldwide. Through their top-class modern testing facilities located in Milan, Berlin (IPH GmbH) and Mannheim (FGH GmbH), they are among the leading international organizations providing measurements and inspection, testing & certification and design review services to the global power industry.

Technical innovation is at the heart of much of what they do. Their network of more than 1000 highly experienced professionals around the world, working from offices and through representatives in 35 countries, is dedicated to delivering customized solutions. These include providing innovative, yet practical,



answers to meet the energy-related challenges of modern equipment and processes. They uniquely combine expertise in strategic and policy consultancy with comprehensive technical and technological know-how.

Francesco Rizzo

Francesco Rizzo, Italian, after the course in Industrial Technology at the Polytechnic of Milan, immediately started working at CESI (Italian Electrotechnical Testing Centre). He developed experience in the study and development of automation, control and protection systems, initially for generation and petrochemical plants, over the past twenty years mainly in the field of the power transmission, acquiring particular knowledge of new technologies, such as HVDC (High Voltage Direct Current) or FACTS (Flexible Alternate Current transmission System). He worked for a long periods in international projects in Spain, Egypt, UAE, Peru, Colombia and, since 2003, particularly in Brazil and Africa. Currently he is the CESI's Area Manager for Africa, Latin America and Iberia.

ENEL GREEN POWER

Founded in December 2008, part of Enel Group, Enel Green Power develops and manages activities for the generation of energy from renewable sources worldwide. Enel Green Power is present in 30 countries in 5 continents with a managed capacity of about 40 GW and over 1,200 plants.

Its production mix includes the main renewable sources: wind, solar, hydroelectric, geothermal and biomass. Worldwide, EGP is one of the main renewable operators with an annual production of about 82 TWh, produced mainly from water, sun, wind and heat from the earth.

The clean energy generated by its plants is able to meet the consumption needs of millions of families around the world and helps reduce carbon emissions, combating climate change and facilitating a new model of decarbonised development.

Having drawn strength from its international experience, EGP also develops bespoke projects to offer companies the best solutions when it comes to energy from renewable sources. Clean energy and sustainable projects, competitive costs and personalised solutions are the main benefits of the Power Purchase Agreement (PPA), tools capable of building solid, long-lasting partnerships with commercial and industrial customers.

Tshepo Tshivhasa

Tshepo is a Professional Engineer that attained his bachelor's degree in Electrical and Electronics Engineering from the University of Johannesburg in 2012. Tshepo has recently enrolled in a Masters degree, mainly focusing on Renewable Energy Storage. He joined Eskom in 2012 and gained 5 years of experience working for Eskom as a Grid Planning Engineer. This resulted in professional competency in all project development and planning aspects of the integrated network of South Africa and Power Systems in general.

Now Tshepo works as a Grid Connection Engineer at Enel Green Power. He is responsible for ensuring that the Renewable Power Plant (RPP) is integrated in the network/grid and it remains compliant with required Grid Codes and standards of the particular country. He has more than a year and half of experience in the Renewable Technology space and well knowledgeable with the RPP standards and Grid Codes of various countries.



Boitumelo Kiepile

Boitumelo held a Bcom (Honours) in Economics from the University of Pretoria and gained more than 10 years' experience in regulatory and policy matters in the financial and banking industry, telecommunications and energy sectors. He held positions as Senior Economist at the National Treasury, Economic and Financial Analyst at the Independent Communications Authority of South Africa (ICASA) and Senior Analyst in the Electricity Pricing and Tariffs Department at National Energy Regulator of South Africa (NERSA).

In October 2010, Boitumelo was a founding member of IMPETUS Regulatory Consultants.

Currently, Boitumelo holds the position of Head of Regulatory Affairs Sub-Saharan Africa within Enel Green Power. He also serves as a Member of the Management Board of the South African Photovoltaic Industry Association (SAPVIA) and as Chairperson of the Policy & Markets Working Group of the South Africa Wind Energy Association (SAWEA).

Guido Caporilli Razza

Guido Caporilli Razza joined Enel Green Power in 2011, working as Energy Manager for renewables power plants for Europe. He has been responsible for forecasting and dispatching of the plants managing a portfolio of 2 GW for Italy. As energy manager, he has been part of the team responsible of hedge the portfolio on the OTC market using financial products (swap, futures and options). In 2016 and 2017, he worked as PPA Manager for EGP South Africa (Johannesburg based) with the mission to manage the relationship between the local TSO according to the PPAs that EGP is currently managing (500 MW of projects Solar and Wind). Guido has a Statistical/Math degree (University of Rome, Italy) and a Ph.D in Econometry and Statistics (same University).

Eleonora Petrarca

Eleonora Petrarca, graduated in Rome in Business Economics, started her carrier in the Enel Group 15 years ago and from October 2017 is the Head of the global unit Business Development Energy Storage in EGP.

Before a bracket (2016-2017) in the Telco sector, where she worked to the start-up of Open Fiber (the company born by Enel Group to develop and build up a fiber network in Italy) as Director of the Performance and Planning and Control office, Eleonora held the role of Chief Financial Officer of Europe and South Africa Area for about three years, within Enel Green Power.

Previously, she matured a strong experience in Finance and Planning and Control, joining different position within Enel Group, developing specific know-how in energy sector (regulatory, energy management and operation) through the Group value chain, from Distribution, to Wholesale Market and Retail.

TERNA

Terna is the majority owner of the Italian high voltage and very high voltage electricity National Transmission Grid. They operate in a natural monopoly and their public service mission is to secure the transmission and dispatching of electricity throughout the country. 90% of their activities are conducted in the regulated market. Their role is crucial in the operation of the entire system. They work to guarantee the supply of electricity to all, companies and private individuals alike.



Listed on the Stock Exchange since 2004 and with around 70% floating shares, Terna focuses on efficiency, profitability and performance, as their results continually demonstrate. With consolidated expertise gained in the management of the Italian grid, they have invested in market activities, with innovative solutions for the energy market and international projects.

Matteo Neri

Matteo Neri is a Chartered Civil Engineer with more than 10 years of International experience in the renewable energy sector (Generation, Energy Storage, Smart grids). Previously he spent other 10 years in the civil engineering sector (construction, water treatment and networks). He currently serves as Energy Solutions Commercial Manager at the International Business Development Dept. of TERNA.



For any further information:

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