

Planning for 21 Century Power Systems

The evolving role of NERSA in power sector planning processes



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INTRODUCTION

NERSA is a legal entity established in terms of National Energy Regulator Act, Act No 40 of 2004 to regulate ESI in South Africa

NERSA was established in 2006 as a successor of the National Electricity Regulator (NER)

The mandate of NERSA is Derived by the Electricity Regulation Act (ERA) (Act No. 4 of 2006) as amended in 2007, New Generation Regulations under the ERA and energy policies:

- White Paper on Energy Policy
- Energy Efficiency Strategy of the RSA
- Electricity Pricing Policy
- Policy to support the Energy Efficiency and DSM through Standard Offer program
- Renewable Energy Policy

ERA MANDATE FOR POWER SECTOR PLANNING

ERA Objectives

The Electricity Regulations Act 4 of 2006 has among others the following objectives:

- *To achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa*
- *To ensure that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency, effectiveness and long-term sustainability of the electricity supply industry within the broader context of economic energy regulation in the Republic*

ERA MANDATE FOR POWER SECTOR PLANNING (2)

NERSA power and duties regarding planning include:

- *The integrated resource plan (IRP) shall be developed by the Minister in consultation with the Regulator (NGR)*
- *Timely provide assistance to the Ministers for purposes of developing and monitoring the implementation of the IRP (NGR)*
- *Make rules for keeping the relevant information, submission of information and rendering of returns by licensees, as required in order to facilitate IRP (NGR)*
- *Issue rules designed to implement the national government's electricity policy framework and IRP (ERA)*
- *Make guidelines and publish codes and practices or make rules (ERA)*

PLANNING ACTIVITIES CHRONOLOGY

The involvement of the Regulator in the power sector planning dates back to 2001, following the publication of the **White Paper on Energy Policy 1998 (WPEP)**

WPEP requires the use of **IRP methodologies in evaluating future supply investments with the regulator managing the implementation of the IRP.**

The NER/NERSA has headed the following resource planning:

PLANNING ACTIVITIES CHRONOLOGY (2)

- Developed an **IRP framework in 2002** and initiated its implementation
- **First NIRP 2001** was developed by Eskom strategic planning division. It was abridged version of Eskom ISEP. Public consultation conducted
- **Second NIRP2 developed under the guidance of** stakeholders' Advisory and Review committee and developed by Eskom strategic planning division. Publication and Public consultation conducted
- **Third NIRP3**, 2006-2009, NERSA managed the development of IRP independent of Eskom by contracting leading US consultants

KEY PLANNING AREAS

IEP, IRP 2010, 2013 and 2015

- Participation in the industry panel developing IRP 2010
- Analysis and formal comments on the draft IRP 2010
- Analysis and formal comments on the draft IEP 2006
- Analysis and formal comments on the draft IEP 2013
- Member of the Steering Committee of IRP 2016
- Monitor and analysis of generation technology costs (LCOE) and performance
- Using Plexos models for studies and sensitivity cases on the IRPs

KEY PLANNING AREAS

MEDIUM TERM SYSTEM ADEQUACY OUTLOOK (MTSAO)

Medium Term System Adequacy Outlook (**MTSAO**) provides an adequacy assessment of South Africa's electricity supply system in the medium term (horizon 5 years FY2016 – FY2020) to ensure its sustainability

The MTSAO studies (generation system simulations) examine the adequacy and reliability of the system, identify the risks of meeting the projected demand and outline options for mitigating them

It highlights steps for improving generation availability as well as new capacity addition

KEY PLANNING AREAS

MEDIUM TERM SYSTEM ADEQUACY OUTLOOK (MTSAO) (2)

It further determines the generation capacity to be procured to bring system back to the required adequacy (MTPPP, STPPP, Imports, other measures), if applicable at the time

The Grid Code version 9.0 of 2015 requires that the System Operator publish the MTSAO by 30 October of each year.

The **first MTSAO** has been developed by the SO in consultation with NERSA and will be published on Eskom and NERSA Web sites in May 2016

KEY PLANNING AREAS

Grid Code (SAGC)

The GC code sets out the rules and conditions for the PS participants to connect and operate in the integrated power system

NERSA is responsible for the development and amendment of the SAGC

The SAGC is divided into 2 main parts: Transmission and Distribution codes.

The *Grid Code* is enforced through the **licensing requirements** of the transmission, distribution and generation *service providers*

Recently developed additions to the set of Codes include:

- *Grid Connection for Renewable Energy generators*
- *Co-Generators requirements*

KEY PLANNING AREAS

Grid Planning Audits

The Network Code sets the criteria and procedures to be applied in the planning and development of the Transmission (Tx) and Distribution (Dx) networks to meet future electricity demand with an acceptable level of reliability.

NERSA conducts **annual transmission and distribution planning audits** for compliance with the Network Grid Code(s)

The transmission planning audits have been conducted from **2002** while the distribution audits began in **2013**.

KEY PLANNING AREAS

Grid Planning Audits

NERSA developed frameworks for Tx and Dx planning audits.

The network planning audits include three stages:

- i. **General evaluation of the planning framework** of the network service provider
- ii. **Assessment of the transmission development plan** or distribution master plans and development plans
- iii. **Detailed evaluation of three projects** from the complete list of projects initiated in the year under review

KEY PLANNING AREAS

Grid Planning Audits (2)

The evaluation of Eskom Transmission's compliance with the network planning requirements covers the following three project categories:

Generation integration projects: projects required to ensure that the network is adequate to evacuate and dispatch power from new generation sources to the load centers.

Transmission strengthening projects: increasing the transfer capacity of the network

Reliability projects: projects to ensure that the reliability and adequacy of transmission network are sustained as load demand increases on the network.

KEY PLANNING AREAS

Grid Planning Audits (3)

The evaluation includes assessment of the following aspects of the planning:

- Overall planning process and framework
- Adequacy of **key assumptions** and **key economic parameters**
- Identification of the need for network development
- Sourcing of data and alignment with IRP, IEP, customers' plans
- Demand forecasting
- Formulation and analysis of alternative options and determination of preferred option
- Technical limits and targets for long term planning
- Criteria for network investments

The audit reports are published on NERSA Web site: www.nersa.org.za

KEY PLANNING AREAS

Economic Parameters

The Network Code requires the methodology for determination of the following economic parameters to be approved by the NERSA:

- Discount Rate
- Cost of Unserved Energy (COUE)
- Other parameters to be specified by NERSA

The methodology for determination of the COUE was approved in 2015 and is available on NERSA Web site: www.nersa.org.za

WAY FORWARD

The issues related to planning currently under development by NERSA include:

- ❑ **Publication of the MTSAO report on Eskom and NERSA Web sites**
- ❑ **Review of Grid Code**
 - Detailed rules for connection of distributed generation and storage
 - Power quality rules for distributed generation
- ❑ **Update of the COUE for 2015**
- ❑ **Distribution Planning audits of metros (CT & PE)**

WAY FORWARD (2)

Revision of MYPD rules: Consultation paper (available on NERSA Web site: www.nersa.org.za) on the MYPD rules including rules related to Eskom planning processes

Some of the **proposed MYPD rules**, related to the planning processes are:

- **Accuracy of plant performance projections** and penalties for not achieving it
- **Detailed rules for the dispatch of OCGTs**
- Requirements for submission of **detailed demand, energy and cost forecast of the IPP purchases per plant and technology**. Cost variances greater than 5% will be subject to prudence and efficiency test

WAY FORWARD (3)

- **IDM:** Development and annual update of a **5-year demand resource assessment** including technical potential and estimated achievable potential
- **IDM:** Alignment of the avoided cost calculation for IDM projects with the IRP, MTSAO and generation production plans
- **System Operator:** Annual plans and targets for demand response programmes including annual update of the market potentials
- **Transmission:** Development of **transmission development plan** in line with the applicable IRP with the focus **to meet Grid Code requirements** and associated capital costs
- **Ring fencing of divisional revenue** with divisional reallocation subject to regulatory approval.

WAY FORWARD (4)

- **Load Forecast:** Must include assumptions regarding IDM programmes, **customer distributed generation and electricity price elasticity**
- **Load Forecast:** Must be **aligned with the IRP, MTSAO and generation production plan(s)**
- **Sales Volumes Forecast Accuracy:** The accuracy of sales volumes forecast should be within 5%
- **Sales Volumes Variances:** Variances higher than 5% are allowed based on external economic factors. However, variances above 5% due to operational and management risks within Eskom control should be disallowed.

THANK YOU!