Kenya National Committee

CONSULTING ENGINEERS

Power Interconnection Standards in East Africa

AFSEC WORKSHOP ON IMPLEMENTATION OF STANDARDS IN THE AFRICAN POWER SECTOR

SANDTON CONVENTION CENTRE, 27-03-2017

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Introduction

Governance Structure

- EAPP started in 2005 by the signing of IGMOU and IUMOU
- Specialized Institution for COMESA with a signed MOU
- Cognisance of the Tripartite Agreement between COMESA, EAC and SADC

Introduction cont……

Institutions in place

- The Ministries in-charge of Energy
- EAPP Permanent Secretariat
- EAPP Independent Regulator
- National System Control
- Power generating companies
- Power transmission companies
- Power distribution companies

Introduction cont…..

Achievements to-date

- Frameworks – Policy, legal, regulatory, institutional
- Power Master Plan
- Interconnection Code
- Interconnection Standards (codes, standards, regulations?!)
- Market Rules
- Operation rules
- Tariff setting guidelines
- Strategic Plan and Strategic Roadmap
- On-going line construction
- Capacity building

Why Standards for power interconnections?

Why do we need the standards?

- The Interconnection code requires it
- For efficiency in planning
- For ease of equipment choosing and choice
- For seamless interconnection
- For harmonious operations
- For efficient utilization
- For avoidance of conflict
- For having a common reference point

Example of a Standard

Code Text	Standard	Measure
Under normal operation, the frequency of the EAPP Interconnected Transmission System shall be nominally 50 Hz and shall be controlled between 49.5 Hz and 50.5 Hz (±1%) unless exceptional circumstances prevail. Following a system disturbance such as a load variation, the frequency band is extended to 49.0–51.0 Hz (±2%). If a major generator is tripped, a major transmission element fails or large loads are suddenly disconnected, the maximum frequency band becomes 48.75–51.25 Hz (±2.5%). If several of the contingencies mentioned previously occur simultaneously, the operating condition is labelled as extreme and the frequency can be below 47.5 Hz or above 51.5 Hz (-5%/+3%) for up to 20 seconds, and then extreme measures should be taken to restore the system. These figures are summarized in Table CC-1.	The frequency of the EAPP Interconnected Transmission System is controlled to between 49.5 Hz and 50.5 Hz (±1%) under normal operation, unless exceptional circumstances prevail.	- Procedures for frequency monitoring and control are documented & implemented - Tools used to monitor and control frequency are described & implemented - System frequency is recorded and stored for analysis - When system frequency falls below 49.5 Hz or exceeds 50.5 Hz, the exceptional circumstances causing the deviations are logged & reported
	If several of the contingencies mentioned previously occur simultaneously, extreme operating conditions, system frequency is returned to between 47.5 Hz and 51.5 Hz (-5%/+3%) within 20 seconds, & then extreme measures are taken to restore the system.	- Procedures for returning system frequency to between 47.5 Hz & 51.5 Hz following simultaneous occurrence of several contingencies are documented & implemented The procedures describe the extreme measures to be taken to restore the system - When system frequency falls below 47.5 Hz or exceeds 51.5 Hz for more than 20 second, following simultaneous occurrence of several contingencies the cause of the deviation is investigated & corrective actions taken, as necessary

Power Interconnection Code

Why the power interconnection code necessary

- Inter-connecting different countries
- Countries have different ways of doing things
- Need harmonious interconnection
- Practices in one country can cause a major disturbance to other countries
- To agree on minimum level of performance
- Need for a guide
- Avoidance of conflict
- Give confidence to all players
- Empower the Regulators with a tool for regulations and conflict resolution

Power Interconnection Code cont….

Sub-codes

- *Planning Code (PC)*
- *Connections Code (CC)*
- Operations Code (OC)
- Interchange Scheduling and Balancing Codes (ISBC)
- Data Exchange Code (DEC)
- Metering Code (MC)
- *System Operator Training Code (SOTC)*

Each code may have several standards to be realized and practiced

What they mean

- SC EAPP Steering committee
- EAPPCC – EAPP Coordinating Centre
- SCP – EAPP Sub-committee on Planning
- SCO – Sub-committee on Operations
- SCE – Sub – committee on Environment
- TSO – Transmission System Operator
- Gen – Generator
- Duser – Distribution User

Standards- Each code has several standards

Code	SC	EAPPCC	SCP	SCO	SCE	TSO	Gen	DUser
PC	0	0	22	5	0	26	0	0
CC	6	25	5	7	0	125	68	23
OC	4	89	8	8	0	135	5	3
ISBC	0	8	0	2	0	25	0	0
DEC	0	0	17	12	0	16	0	0
MC	0	13	0	0	0	35	0	0
SOTC	36	43	0	0	0	45	0	0
Total	46	178	52	34	0	407	73	26

Where are we with the Standards

- EAPP has developed the power interconnection codes and Standards
- These could have reference to IEC standards
- COMESA has adopted the EAPP Standards (EAPP is a specialized institution of COMESA for Energy and power)
- Recognizing the Tripartite Agreement and in consideration that COMESA has the task to hand issues of power and energy on behalf of the tripartite. (Harmonization of the REC issues), the COMESA Interconnection Code and Standards can be considered as regional
- The 7 RECs will soon be interconnected with power and agreed standards and Codes at the continental level (AUC)

IEC and AFSEC Standards

- Codes, Standards, Regulations, Guidelines
- Trying to discover a new wheel will result in a squire wheel
- Adopting and/or adopting
- National/regional/international

Gap Analysis – A tool – Tackling Challenges and solving problems

On what? Solve a problem only for those who know they have one. Assist recognize the problem.

- Ministries in charge of energy
- Regulator/s EAPP and National
- EAPP Secretariat and Coordination Centre/s
- Power Generators
- Power Transmission companies
- National System Control
- Distributer

Gap analysis – Questions to ask

- Where are you now?
- Where should you be?
- What is the difference?
- What is the implication?
- Can we bridge the gap?

Gap Analysis- Bridging the gap

Need to come with a program for bridging the gap

- Does something need to be done?
- Needs to be done on what?
- Can something be done?
- What can be done?
- How to do it?
- Where to do it?
- When to do it?
- Who to do it?
- At what cost ?

Conclusion

- Need to move fast to ensure full acceptance and application of the Interconnection code and the Standards. RECs eg under Tripartite to build on what has been achieved without duplication. Harmonization for regional integration
- Need to urgently complete gap analysis using the tool already developed and piloting completed
- Need to urgently need to bridge the gap or come up with strategic roadmap for completion
- Countries to work closely with RECs, Power Pools, AFSEC and IEC in the adoption adaptation and use of the relevant standards
- EAPP and countries to consider and mitigate effects of inter-connecting different counties power systems
- AUC and RECs to continually consider the power system security issues that may or will arise with continental-wide power inter-connections.
- Need for active participation by utilities and countries in their power pool grid code and standard's activities to ensure inclusiveness
- Participation in the national committees such as of AFSEC, NCIEC
- Since soon all the countries of Africa shall be inter-connected, need to be fully active at the continental level, eg active participation in AFSEC

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Thank you

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