DU 14 au 16
MAI 2014

THEME
LES SMART GRIDS UNE SOLUTION POUR UNE AFRIQUE EMERGENTE

GENERAL REPORT
AFRICA SMART GRID FORUM 2014

Abidjan, 14 to 16 MAY 2014

In August 2013, at the 3rd AFSEC General Assembly held in Nairobi, it was decided to organize this forum on the theme "**Smart Grid, a solution for an emerging Africa"**.

Thus the first African Forum on Smart Grid called **"Africa Smart Grid Forum 2014"** was held from 14 to 16 May 2014 at Sofitel Hotel Ivoire in Abidjan, Côte d'Ivoire.

Participants at the forum:

- 223 delegates from 28 countries: Africa (21), Europe (5) and Asia (2)
- 23 experts
- 15 exhibitors.

1 – OPENING CEREMONY

The ceremony began with an address by **Mr Mathias N'GOAN, Mayor of Cocody,** hosting the event.

After welcoming the different official representatives and delegations he thanked the government of Côte d'Ivoire for the organization of this forum which shows clearly the importance the country places on the development of renewable, clean and sustainable energies.

Dominique KAKOU, CEO of CIE, then also welcomed all participants and hoped that this first Forum on "Smart Grid" would be a milestone in the process of development of the electricity sector in Africa. Moreover, he expressed his gratitude and appreciation to **Minister Adama TOUNGARA**, **Minister of Petroleum and Energy,** for sponsoring and chairing this forum.

After having traced back the emergence of the concept of **Smart Grid**, he gave an overview of the situation of electrical utilities in sub-Saharan Africa, which do not have adequate research/ development structures and, moreover, operate electrical networks under severe constraints, with a demand that often exceeds the supply. The Director General of CIE asked utilities to consider the challenges and opportunities of this new concept and the benefit of the development of **Smart Grid**.

He ended his speech by thanking on first the various institutions and organizations – AFSEC, CODINORM, ASEA, IEC – for their support and then the sponsors as well as the technical and financial partners for their ongoing support and last but not least all participants, especially those from other countries in Africa, Europe, Asia ...

In his speech, **Claude KOUTOUA, President of AFSEC,** expressed his satisfaction to have organized this forum on Smart Grid which is a first of the kind in Africa. This shows AFSEC's willingness to contribute to standardization and conformity assessment activities by giving African experts the necessary tools and practices to the benefit of the people of Africa.

He thanked Mr Dominique KAKOU, CEO of CIE, for having understood the value of such an event and agreed to organize it.

Furthermore after mentioning that the concept of Smart Grid is about the integration of technology throughout the chain, from production to the consumer's switch, he emphasized that, on the African continent, there are no facilities for research and development, no high level research laboratories, and no control over the production lines of the electrical equipment. If nothing is done "**we will end up with obsolete equipment and without the possibility of providing operating and maintenance tasks"** he said**.** He concluded that there is **no choice but to get involved with Smart Grid.**

He ended his speech by expressing his deep appreciation and gratitude to the International Electrotechnical Commission (IEC), the European Committee for Electrotechnical Standardization (CENELEC), the German Electrotechnical Committee (DKE), the State Grid Corporation of China, the Korean Agency for Technology & Standards (KATS), the African Energy Commission of the African Union (AFREC / AU), the National Standards Body of Côte d'Ivoire (CODINORM), the Association of Power Utilities of Africa (APUA), the Ministry of Petroleum and Energy and finally all delegates.

Mr Frans VREESWJIK, Secretary General of the International Electrotechnical Commission (IEC), said the issue is not to know whether Africa is ready for the Smart Grid: **It is no longer an option, it is a necessity**. He went on that Smart Grid facilitates the supervision of existing networks, enables integration of renewable energy sources and permits to get free from legacy systems. He said that Africa must seize the opportunity to innovate and build intelligent networks from scratch, following the example of China.

Dr Hussein ELHAG, Executive Director of AFREC / AU representing Philippe NYONGABO, Head of Energy Division (AU) said that Africa still faces huge challenges which are poor access to electricity, the difficulties of rural electrification and the excessive cost of electricity generation. In addition to these challenges there are political and regulatory barriers, an energy market that does not attract investors, inefficient databases and information systems at the state and continental level.

He went on that the energy potential of Africa is immense regarding hydroelectric, solar and geothermal energy. The continent is full of coal resources (6% of the world reserves) and 70 billion tons biomass. To conclude, he stated **that the introduction of Smart Grid is a chance for the African continent** and that the existence of power pools for interconnection seems to be the ideal framework for the promotion of smart grids.

Mr Adama TOUNKARA, Minister of Petroleum and Energy, Patron and Chairman of the ceremony shared his real pleasure to chair this international forum on the theme **"Smart grids, a solution for an emerging Africa"** which is in line with the vision of His Excellency the President of the Republic of Côte d'Ivoire, **Dr Alassane OUATTARA**, for Côte d'Ivoire to be an emerging country by 2020.

He further stated that energy is a key factor for economic development and social progress in our countries and the issue of efficient and sustainable supply of electricity remains one of the main challenges that the Ivorian Government needs to face, just as do the majority of the Governments of African countries.

Finally, after giving a feedback on the current and future situation of the Ivorian power sector, he said that **he placed considerable hope in this new technology to help find solutions to improve access to electricity for our people**. He then declared open the Africa Smart Grid Forum 2014 under the theme: **"The Smart Grids, a solution for an emerging Africa"**.

2 – FORUM RECOMMENDATIONS

In view of the discussions we had, and after the declaration of **Mr Frans VREESWIJK**, Secretary General of the IEC: "Smart Grids are not an option for Africa, but rather a necessity," the forum recommends the following:

1. Establish a legislative and regulatory framework in favour of the promotion of Smart Grid to adapt the institutional environment
2. Promote the development of mini-, micro-, nano-and pico systems for electricity generation and distribution, based on renewable energy in rural areas, giving taxation benefits to companies that invest in the development of Smart Grid

3. Build the capacity of AFSEC to intensify its relationship with standardization bodies (IEC, CENELEC, KATS, SGCC and DKE) in order to develop rapidly specific harmonized standards to support the deployment of Smart Grid in Africa.
4. Capitalize the feedback from policies and strategies of Western and Asian countries for the deployment of Smart Grid, through technical benchmarking training on all aspects of planning, management and monitoring of the development in Smart Grid.
5. Promote smart meters (with pre-payment or post-payment option) including all their monitoring devices, and remote management to improve energy efficiency, management supply / demand balance of existing electrical systems and offer new services to consumers
6. Actively involve African experts in the work of the Technical Committee for Conformity Assessment and of the Technical Committees 13 and 57 of the IEC in charge of standardization issues related to the development of Smart Grid.
7. Promote the deployment of PLC technology (power line) and any other technology to connect consumers and information systems of electrical networks in Africa
8. Develop investment programs on Smart Grid in Africa.
9. Raise the awareness of African decision makers and governments on the need to support the deployment and development of Smart Grid in Africa.

All countries of the African continent are encouraged to develop a comprehensive Smart Grid strategic plan, together with a roadmap based on these recommendations.

It is appropriate that the African Union, in collaboration with NEPAD and African financing organizations takes the initiative to organize a round table on the financing of "Smart Grid" on the African Continent.

3 –COMMUNICATION SUMMARY

Thirty (30) presentations were recorded, divided into two parts according to the following program:

	Wednesday 14 May 2014		
16:30	Opening ceremony / Exhibition and welcome party		
	Thursday 15 May 2014		
08:30	Coffee break		
09:00	Keynote speakers		
12:15	Lunch and exhibition		Exhibition
13:30	Session **A1**: Evolution of the means of production	Session **B1**: New ITC and Smart Grids	
15:30	Coffee break		
16:00	Session **A2** : Evolution of smart transportation systems	Session **B2**: Smart Grid and consumers	
18:00	Transfer		
19:00 23:00	Smart Grid Africa Gala		
	Friday 16 May 2014		
08:30	Session **A3** : Development of distribution network	Session **B3** : Smart Grid in the city	Exhibition
10:45	Coffee break		
11:15			
12:15	Lunch and Exhibition		
13:30			
15:30	Coffee break		
16:00	Smart Grid Forum Africa 2014 Wrap up and conclusions		
17:00	Closing		

The first part, entitled "Keynote presentations" introduced the topic of "Smart Grid" and consisted of eight presentations whereas the second part consisted of 22 presentations on thematic issues that have been dealt with in two parallel sessions A and B.

3.1 –COMMUNICATION SUMMARY AND DISCUSSION OF PRELIMINARY PRESENTATIONS

The session on the keynote presentations was chaired **by Mr Philippe NYONGABO, Head of Division Energy (AU)** and the Rapporteurs were **Aimé GOBEY and Eboua ATTIE**.

A total of eight (8) papers were presented. They dealt with

1. Future of Smart Grid in Africa: Making Sky Image of Africa Brighter : ***Dr Hussein ELHAG***, Executive Director of AFREC/UA
2. Design of Smart Grid, current situation and evolution: ***Richard SCHOMBERG,*** Chairman of IEC Smart Grid Strategic Group
3. Vision, challenges, opportunities and evolution of Smart Grids in China**: *Yueming CHEN*, SGCC Executive Vice President**
4. Renewable energy and energy efficiency roadmap for Côte d'Ivoire: ***Sabati CISSE***, Director General for Energy in the Ministry of Petroleum and Energy
5. The features of Smart Grid in Korea : ***Jee-Sik PARK***, National Coordinator for Smart Grid Standardization (KATS)
6. Issues, challenges and perspectives of electrical system operation, case study from Côte d'Ivoire : ***Mathias KOUASSI,*** Deputy General Manager of the Distribution pole of the Compagnie Ivoirienne d'Electricité (CIE)
7. European standardization in the field of Smart Grid : *Rationale, state of play and way forward :* ***Uwe KAMPET,*** CENELEC Vice President Technical
8. Smart Grid - the key to a Smart energy future for Africa: ***Frans VREESWIJK,*** IEC General Secretary

From these presentations and the discussions that followed, we will remember that

- Africa must build its own model that will include the conventional system, the system of isolated distributed generation and the Smart Grid approach.
- Before engaging in Smart Grid, Africa must consider the problem of losses that range between 16.5% (Maghreb) and 35.7% (West Africa) whereas the international standard is 10%. These losses could be curbed with the deployment and development of Smart Grid
- The best approach to Smart Grid would build a complete model to be experimented in one country or specified area before implementing it in other countries.

- Africa has considerable resources and at the same time has enormous needs in terms of electrical energy. Advances in Smart Grid can significantly contribute to the development of its electrical system by providing solutions for:
    - improving energy efficiency;
    - reducing technical and non-technical losses;

    - Increasing reliability.
- As it has been the case with mobile telecommunications, Africa has the opportunity to boost the progress of Smart Grid through innovation, particularly in terms of mini-, micro-and nanogrids which the world will need.
- IEC standards could help Africa develop smart grids that comply with the large global market.

- In China, three steps were implemented by the SGCC to promote the construction of a strong and smart network. They are :
    - Strategic planning that integrates all areas related to Smart Grids, including standards and Research and Development tools
    - Construction of transmission and distribution networks in urban and rural areas, including smart grids and aspects of technology equipment
    - Completion of robust smart grids, improving aspects of capacity, safety and efficiency of the system while ensuring a perfect interaction between energy sources, networks and consumers.
- The Chinese experience shows that Smart Grid is not just a worldwide fashion trend in electrical systems but is a pre-requisite for economic development and the emergence of green companies.
- The SGCC is willing to share its experiences with counterparts and ready to promote research and development in relation to Smart Grid.

- The Korean experience is based on two main objectives, i.e. to reduce CO2 emissions by 30% and to improve energy efficiency by 46.7% in 2030.
- The strategy was implemented on the basis of a law for the promotion of Smart Grid. This regulation has put in place:
    - A global master plan for Smart Grids
    - Research and Development support
    - A framework for integrating international standards
    - The issuance of business licenses for Smart Grids
    - Incentive investment in Smart Grids.

- In Côte d' Ivoire, the vision of the Ministry of Petroleum and Energy is to be the first energy market in sub-Saharan Africa by 2030, which would contribute to its emergence in 2020.
- In this dynamic, the Ivorian government has set strategic priorities, including:
    - Improvement of the legal and regulatory framework
    - Development of renewable energy
    - Development of energy management.
- An electricity code was adopted this year to improve the legal and regulatory framework. An action plan is being developed for:
    - The development of renewable energy by building small hydroelectric units
    - The recovery of household waste and agro industrial residues
    - The hybridization of the solar system to existing remote stations
    - The establishment of photovoltaic systems and vulgarization of solar kits.

- With respect to the CIE, the energy transportation and distribution networks have a production-consumption balance such that the Smart Grid could help to:
    - Better manage the flow of energy
    - Facilitate the conduct of HTA networks, including period of disruption, and better manage the rationing
    - Implement monitoring devices and telemetry counting to increase energy efficiency.

- Standardization work is going on in Europe at the initiative of the Commission of the European Union to define and implement a reference model for the development of smart grids in Europe and worldwide. The joint work of the three European standardization bodies, CEN (Information Systems), ETSI (Telecommunication) and CENELEC (Electricity) has led to define a process for developing Smart Grid in 8 steps based on a reference architecture model.

- The future will be a world of smart electricity. Smart Grid is not a choice but a necessity to facilitate supervision, remote control and self-correction, resulting in more responsive and efficient networks.
- Interoperability is a key element as a multitude of technologies, systems and devices must communicate with each other in a safe and efficient way
- With the tools and methods provided by IEC Standards, African countries could develop a robust and sustainable infrastructure
- The deployment of Smart Grid is based on three interrelated aspects that must be addressed simultaneously. Any project that does not integrate seamlessly is doomed to failure. These are the issues :
    - production, transport, distribution, consumption, telecommunications and interoperability (technical aspects)
    - business model (financial aspect)
    - statutes and regulations (regulatory aspects).

For African countries, it should be noted, however, that

- ***Governments should provide a good roadmap, and take adapted incentive measures for the private sector and investors***
- ***The approach to implementation of a smart grid project should be based on a consistent and global strategic plan, based on a clear and shared vision.***
- ***Significant challenges need to be taken into account on the technical, financial and regulatory level***
- ***The implementation of awareness actions and training of consumers is necessary.***

3.2 – COMMUNICATION SUMMARY AND DISCUSSION IN SESSION A AND SESSION B

Twenty-two papers (22) were presented in six (6) parallel sessions which dealt with the following topics:

- A1 - Evolution of production means in the context of Smart Grid
- A2 - Evolution of smart transportation and distribution systems
- A3 - Development of distribution networks
- B1 - New ITC and Smart Grids
- B2 - Smart Grid and consumers
- B3 - Smart Grid in the city.

3.2.1 - A1 - Evolution of production means in the context of Smart Grid

This session was chaired by **Mr Uwe KAMPET**, Vice President Technical of CENELEC and the Rapporteur was **Eugene BOTO**.

A total of three (3) papers were presented. They were:

1. Integration of large-scale renewables in the energy mix (methods and techniques) : ***Dr Yongning CHI***, Chief Engineer of Renewable Energy Department (China Electric Power Research Institute, SGCC);
2. Strategy for the Grid Integration of Renewable Energy on the example of the German "Energiewende" : ***Marco PETER***, responsible for the photovoltaic strategy in DKE
3. Green Energy Policy and Smart Grid in Korea: ***Kyung-Jin, BOO***, Professor (Seoul National University).

From these presentations and the discussions that followed, we will remember that:

- In China, the integration of large scale renewable energy was made, including wind energy. However, it should be noted that this requires a study and good knowledge of the network in order to control its impact on the stability of existing networks.
- In Germany, the energy transition has done an energy shift based on the substitution of conventional energy by the introduction of renewable energy and Smart Grid. In the field of standardization, the country has chosen to move towards international standards intensifying its relations with CENELEC and IEC.

- In Korea, due to various crises, the implementation of two national energy plans - based primarily on the expansion of distributed generation and smart grid system - has created a synergy in terms of energy efficiency and reduction of greenhouse gas emissions.

For African countries, the emphasis should be on:

- ***Regulatory framework related to the consideration of renewable energy in a flexible way***
- ***Conducting study on network stability and environmental impacts***
- ***Availability of information in real time and in a synchronized way about production versus consumption.***

3.2.2 – A2 - Evolution of smart transportation and distribution systems

This session was chaired by **Philippe MICHAL**, Project Director Africa, and Middle East - RTE International and the Rapporteurs were **Narcisse YAO Kacou** and **Alain KONZI**.

A total of two (2) communications were presented. They were:

1. New Digital Substation architectures for Smart Grids (EHV & HV/MV SS) : ***Laurent SCHMITT***, Vice-President Smart Grids Solutions ALSTOM for CENELEC
2. How to ensure better stability and reliability of transportation and distribution networks: ***Hongzhu TAO***, Deputy Division Director of power automation, dispatching department, SGCC.

Frome these presentations and the discussions that followed, we will remember that:

- In the scope of transmission and distribution, new concepts of smart substations were introduced. These concepts are based on technical differentiated architectures with features that take into account the smart management of electrical station legacy; safety management and inter-stations new automation functionality.

- In China, due to the fact that centres of consumption are far away from production centres on the one hand, and on the other hand the imbalance between energy resources and consumption, it has been necessary to implement construction projects over long distances of large energy capacity line transmission.
- To meet the different interconnection requirements, SGCC has implemented a special protection scheme (SPS) and an operating smart grid technology.
- It is a great challenge for network managers to sustainably maintain stable operation of power grid hybrid AC / DC. The SGCC had received some feedback. Several tests were made and some successful practices were presented, particularly in the area of a special protection scheme (SPS) based on control strategies of reception and emission areas as well as Control System Technology operating smart grids. It should be noted that a strong and intelligent network is essential and fundamental to ensure safe operations.

For African countries, the emphasis should be on:

- ***Coordination of protection with the introduction of smart grids. Studies should be made.***

- ***The management of information flows, in terms of operation and maintenance, from new smart devices,***
- ***The use of standards and conformity assessment for equipment. This involves participation in Technical Committees of AFSEC and IEC,***
- ***The implementation of technology AC / DC hybrid networks as part of the construction of large interconnection networks.***

3.2.3 – A3 - Development of distribution networks

This session was chaired by **Marco PETER**, Manager Strategic Photovoltaic - DKE and the Rapporteur were **Charles AMATCHA** and **Marc BAAH**.

A total of four (4) communications were presented. They were:

1. Smart Grid developments and the IEC : ***John NEWBURY***, Convenor of IEC Technical Committee 57, Chairman of the UK IEC TC57 Committee.
2. Journey towards a Smart Utility: an eThekwini Electricity perspective : ***Jonathan, HUNSLEY***, Project Executive eThekwini Municipality, South Africa
3. Design smart electrical distribution architectures to serve the Smart Grid : ***Hervé BIGEARD*** - MV Automation Director - Schneider Electric
4. Smart grid in Egypt**:** ***Sabah MASHALY***; Secretary of AFSEC TC13.

From these presentations and the discussions that followed, we will remember that:

- For 30 years, the development of smart grid has been due to the partnership of several countries and standardization bodies which have joined efforts to develop Smart Grid worldwide.
- The work of the various standardization bodies helped to integrate scientific and technical expertise in all aspects of electrical networks, energy and communications systems.

- The experience made in the east of South Africa shows that any modernization requires work. Working groups should be established, which are based on the state of the art in this field and will define a comprehensive strategy with a vision. In this context the issue of precarious and vandalism organized neighbourhoods should be taken into account. To ensure the success of the operation, one should seek the support of the state and strengthen staff skills.

- To design intelligent power distribution architectures for Smart Grid, the first step is the development of a modern medium voltage architecture integrating communication functions and supervision.
- These functions must take into account management systems for demand and those for energy through the automation and self-healing solutions.
- The need for integration of multivendor systems for smart grids, with the unavoidable involvement of end users in standardization for a development that will benefit to all, including cost aspects, efficiency and sustainability.

- Beside other advantages, the interest in Smart Grids has been raised in Egypt by the need to motivate operators, to provide quality energy on the one hand and encourage the emergence of a flourishing market for electricity; on the other hand, to motivate the consumers to manage their consumption.
- This has resulted in an optimal use of networks followed by the harmonization of supply and demand. The added benefit has also come from the fact that distributed generation has been strengthened, particularly in the field of renewable energy despite regulatory and technical challenges.

For African countries, the emphasis should be on:

- ***The level of maturity offered by today standards which constitutes an opportunity to develop the smart grid in Africa.***
- ***Guarantees of political and regulatory stability to be provided to various stakeholders***
- ***New features that should be incorporated into the network to make it reliable and optimize it fully to meet the user demand.***
- ***Capacity building for African experts.***

3.2.4 – B1 – New ITC and Smart Grids

This session was chaired by **Frans VREESWIJK**, IEC General Secretary, and the Rapporteurs were **Ambroise DJAHA** and **Roland HILL**.

A total of four (4) communications were presented. They were:

1. Smart Grid and Application to African Countries : ***John NEWBURY***, Convenor of IEC Technical Committee 57, Chairman of the UK IEC TC57 committee;
2. Internet in every household more than 20 Mbp / s PLC outdoor : ***Daniel SAMPAH***, CEO AWALE.
3. The G3 PLC communication protocol : ***Marc DELANDRE*** Secretary General of the Alliance PLC G3 and Deputy Director of Project Linky, ERDF
4. New ETSI-CEN-CENELEC approaches for the rapid deployment of Smart Grid projects: ***Laurent SCHMITT***, Vice-President Smart Grids Solutions ALSTOM for CENELEC.

From these presentations and the discussions that followed, we will remember that:

- There is now a group of organizations working on the standardization of PLC communication and on the regulatory environment for the deployment of this technology in terms of frequency spectrum used for broadband or narrowband communication.
  The existence of leakage radiation in the high frequency spectrum is to be considered in the use of PLC technology.

- In the field of the use of broadband PLC technology the experience from AWALE Company was presented. This deployment is supported on a communication path with very high speed optical fibre to connect the main

PLC injection stations with the secondary PLC injection stations (SHE) which communicates wireless to create local PLC loops.

- The PLC technology is a great opportunity for African countries to provide high-speed communication services without significant construction costs regarding wireline infrastructure for people already connected to the electricity distribution network.

- Protocol PLC G3 (G3-PLC ™) was developed to meet the communication needs of businesses in the sector of electric power. The main features of CPL G3 - communication speed, robustness, safety, reliability - are assets for the development of Smart Grid. The PLC G3, with its ability to cross the transformers, to support IPv6 addressing, allows the use of existing network infrastructure as a physical communication medium.
- The PLC G3 offers African utilities a strong communication support with low-cost deployment for the management of smart metering and communication with their customers.

- Ongoing standardization work in Europe have led to define a process for development of Smart Grid in 8 steps based on a reference architecture model, a methodology to follow, supporting tools, libraries of standards that take into account the issues of security and interoperability in smart grids.

In each country, the deployment of smart grids meets needs which may be different. However, the smart grid is not an option for Africa. It is an absolute necessity. In the development of Smart Grid, one should

- ***master standards***
- ***participate actively in the various harmonization work done within AFSEC and IEC Standardization Technical Committees (e.g. TC 57 and TC 13)***
- ***move towards strong, secure and reliable communication supports***
- ***follow various experiences around the world.***

3.2.5 – B2 - Smart Grid and consumers

This session was chaired by **Siaka BAKAYOKO**, Deputy Director General of the Ivorian Electricity Company and the Rapporteurs were **Eboua ATTIE** and **Don TAYLOR**.

A total of five (5) papers were presented. They were:

1. Smart Grid and the elimination of fraud or non-technical losses on distribution networks: ***Hervé BAUDOUX***, Delivery and Support Manager for France, Mediterranean and French Speaking countries – **ITRON**, Electricity Division.
2. " Linky", the smart metering project in France : ***Marc DELANDRE*** Secretary General of the Alliance PLC G3 and Deputy Director of Project Linky, ERDF
3. Smart Grid and consumers. The South African Smart Grid strategy : ***Dr Minnesh BIPATH***, Senior Manager Smart Grids, Data and Knowledge Management South African National Energy Development Institute

4. Remote management of meters to optimize the use of a local loop PLC : ***Daniel SAMPAH***, CEO AWALE
5. Smart Grid, the smart meters or « consum'actor » birth: ***Hervé BAUDOUX***, Delivery and Support Manager for France, Mediterranean and French Speaking countries – **ITRON**, Electricity Division.

From these presentations and the discussions that followed, we will remember that:

- The growth rate of gross electricity consumption over the last five years is between 6% and 10% in most African countries. This strong growth has not always been accompanied by a sufficient level of investment and has raised the following issues:
  - Operation of electrical systems at their capacity limit
  - Increase in technical and non-technical losses (fraud)
  - Difficulties in operating and conducting the distribution networks
  - Difficulties in billing the delivered energy.
  - …
- To cope with the changes in the energy landscape, it is necessary to modernize the electrical system. The deployment of "Smart Grid" technology prevents network congestion by proper use of infrastructure, taking into account energy efficiency, consumption management and promotes return on investment.

- Innovative communicating metering systems developed by ITRON or ERDF (Linky) have become the cornerstone of these new challenges. These systems offer the following features:
  - Management of energy flow (forecast, deletion, reliable counting)
  - Troubleshooting, reducing response time and billing through remote access to counter
  - Insertion in the network of renewable energy and electric mobility
  - Fight against fraud
- These new technologies must meet the requirements for interoperability or interchangeability and must rely on a reliable and secure transmission system based on international standards.

- Implementation of Smart Grid technology in South Africa has the following objectives:
  - Sustainable reduction of 20% of maximum national electricity consumption in 2012.
  - 100% availability of the electricity supply to all utilities.
  - 40% improvement in the efficiency of the electrical system on the basis of the reduction of technical and non-technical losses recorded in 2012 and achieving a load factor of 70%.
  - Integration of a capacity of 8 GW in the distribution networks of renewable energy sources.

    - Improved customer service to achieve customer satisfaction index above 80%.
- The institutional framework is already in place and there is a roadmap involving the industry which is followed.
- The adoption and participation in the system of clients who become "consum'actors" are key success factors for integration of smart grids projects.

- The remote management counters project in Côte d'Ivoire by AWALE in partnership with CIE is a successful example of integration of "Smart Grid" solution for the control the billing and demonstrates the viability of the PLC solution as a support for data transmission.

The development of smart meters is an opportunity for African countries, insofar as it will help in the fight against non-technical losses and especially to avoid future obsolescence of electromechanical meters.

For African countries, the emphasis should be on:

- ***Regulatory framework related to the use of smart meters***
- ***Development of communication with consumer customers through awareness and training***
- ***Traceability of operations carried out on the counters locally and remotely***
- ***Best consideration of interoperability, interchangeability and cyber security in order to guarantee the reliability and confidentiality of data in Smart Grid projects***

3.2.6 – B3 - Smart Grid in the city

This session was chaired by **Richard SCHOMBERG**, President of IEC Smart Grid Strategic Group and the Rapporteurs were **Leander N'DRI** and **Gauthier MPANGA.**

A total of four (4) papers were presented. They were:

1. Remote reading water and electricity: Feedback from LYDEC Casablanca : ***Abdeljaouad BENHADDOU*** , Chargé de mission to the Director General of LYDEC
2. New ITC architectures for the deployment of Smarter Cities : ***Laurent SCHMITT***, Vice-President Smart Grids Solutions ALSTOM for CENELEC
3. Multi-fluid remote reading: Feedback from Ondeo Systems : ***Pierre SACAREAU*** , Products and Innovation Manager from Ondeo Systems
4. Fueling Sustainable and Smart City Development **:** ***Yimin WANG,*** Vice Chief Engineer of SGCC**.**

From these presentations and the discussions that followed, we will remember that:

- Two (2%) of the land are occupied by cities, rising to 70% in 2050. This rapid urban population growth is associated with the shortage of resources (energy, water, space, mobility, funding, etc...) It is crucial to find solutions to make cities attractive and vibrant.
- In this context, a new concept is gradually emerging, that of "Smart Cities." These are modern cities capable of implementing infrastructures for water, electricity, gas, transportation, emergency services, utilities, buildings, etc... which are connected and sustainable to enhance the comfort of citizens. And more efficiently and friendly with the environment.

- Among the solutions in the provision of public network utilities (water, electricity), remote infrastructure and clients / customers management systems were presented:

    - LYDEC experience in managing multi-services in the Casablanca region in Morocco , can be defined by:
        - A geographic information system integrating legacy and users for all services (water, electricity , public lighting , sanitation);
        - Network remote management (monitoring, event detection , troubleshooting , remote management)
        - Remote management of billing.

    - Ondeo Systems presented a remote reading architecture regarding water distribution with the aim of transforming the business of billing by introducing more transparency and interactivity with consumers and optimizing operations. The lessons learned from several years of implementation is that the optimum remote meter architecture requires :
        - Simple and easy implementation ;
        - High performance and reliability of the system for collecting and processing data;
        - The implementation of software for processing and producing information and dashboards for real-time operation.

- The experience of Alstom has focused on the concept of micro grid subsystems that are more or less autonomous in the distribution network and allow islanding areas in micro grid. And this:
    - In case of incidents
    - for grid stabilization through islanding and operation by an independent source
    - for domestic self-production and interaction with the interconnected network.

- The experience of SGCC presented the overall approach and strategy developed by this huge global utility to integrate Smart Grid as a tool for controlling a network over all of China. Significant resources have been used by China to launch the project which is divided into three phases:
    - planning and pilot project;
    - development of architecture and equipment;
    - deployment and monitoring.

From the discussion, African countries will have to develop a comprehensive "Smart City" strategy bringing welfare to their people, together with an action plan subject to planning. Within this framework, financial resources should be provided.

For African countries, the emphasis should be on:

- ***Improving urban services using smart grids,***
- ***The development of micro grids with independent remote production sources***
- ***Optimized management of all contracts for urban services.***

Done in Abidjan May 16, 2014

General Rapporteur **President of the Organizing Committee**

Albéric YAO YAO **Abdoulaye SANOGO**

AFSEC President

KOUTOUA Claude