ISO 9001 : 2008

TEC

टी ई सी संचारिका
NEWSLETTER

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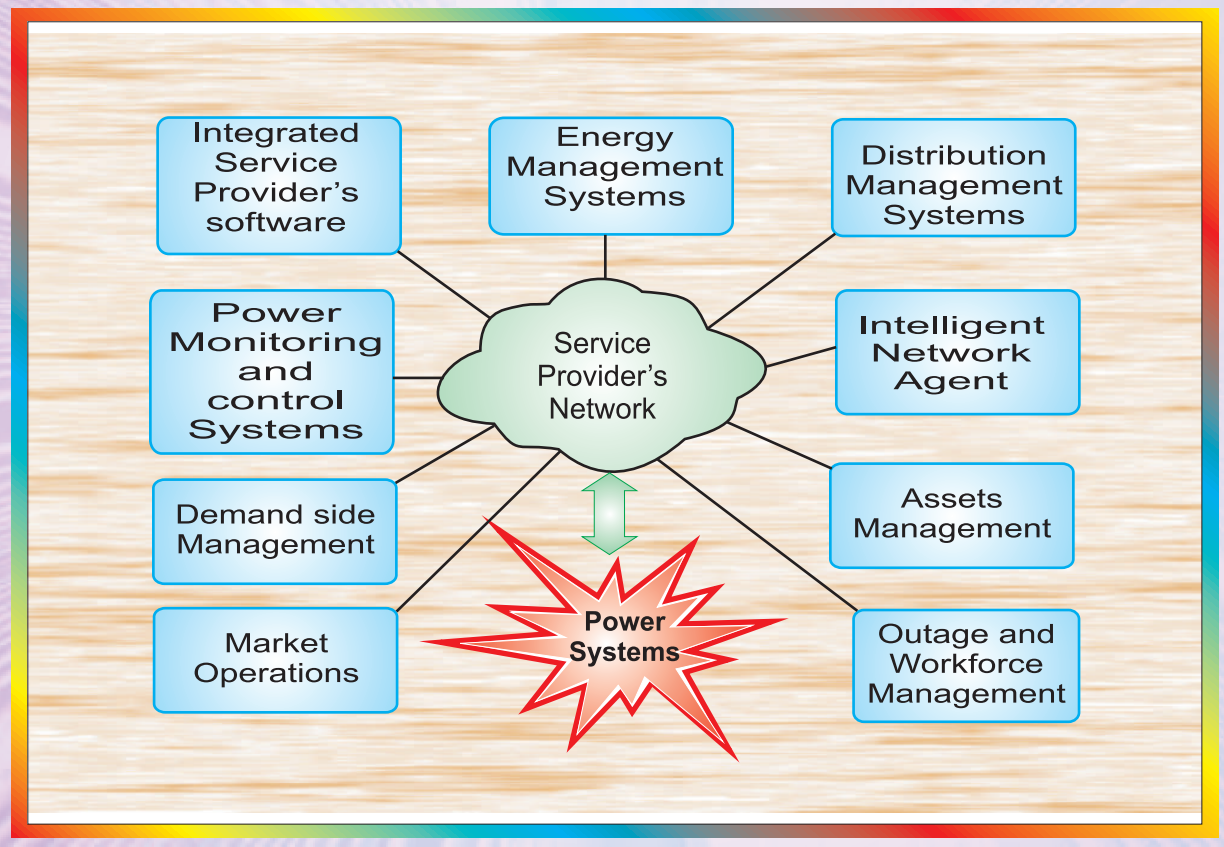
SMART GRID IN INDIA



ISO 9001:2008
TELECOMMUNICATION ENGINEERING CENTRE

IN THIS ISSUE

1.0 Introduction:

Last two to three decades have witnessed fast development in the field of Telecommunications. Some countries like US, South Korea etc; have enhanced their electric networks by modernizing their power grids with the help of Information and Communication Technology (ICT). India being a large consumer of electricity may also plan to enhance traditional electric network with the smart grid network. Smart Grid will be useful to save power and its efficient utilization in addition to improve reliability of the power and to integrate non-conventional energy resources.

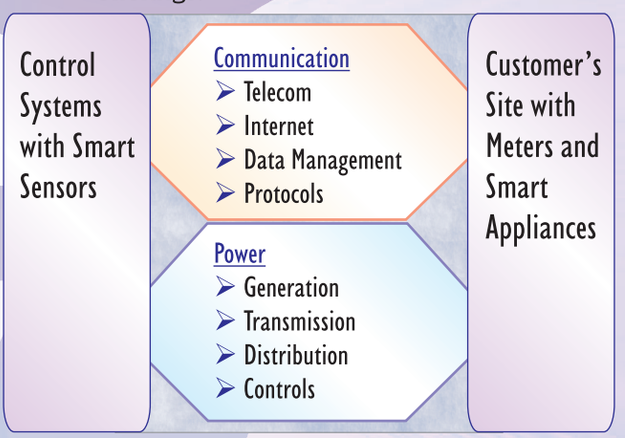
2.0 Power Losses in India's Electricit Network:

India is the 5th largest energy consumer country in the world having more than 17% of world population. It generates about 65.3% of its electricity through thermal plants, about 21.5% by hydroelectric plants and remaining from others sources like nuclear plants and renewable energy resources. Further, India has also planned to invest huge amount of funds for the installation of various nuclear reactors. However, India's electric network is extremely poor. According to Ministry of Power, transmission and distribution losses are the highest in the world, averaging 26% and when non-technical losses like theft are included, total average loss comes to as high as 50%. In a country like China, transmission and distribution loss is 3% and total 8% including theft. In US, T&D loss is 6.5%. In UK, T&D loss is 7.7%. In Brazil, T&D loss is 16%. India's estimated financial loss is 1.5% of the national GDP due to such a high T&D loss. The major contribution towards such loss is due to poor distribution network.

3.0 Smart Grids:

As defined by Centre for study of Science, Technology and Policy; "Smart grid" is a nebulous term spanning various functionalities geared towards modernizing the electricity grid. A smart grid utilizes digital communications and control to monitor and control power flows, with the aim of making the power grid more resilient, efficient, and cost-effective. Some of the desired functionalities include:

- Knowing the status of the power system in great detail and granularity in real-time,
- Reacting to any changes in supply (disruptions) or demand,
- Enabling small-scale (distributed) storage and power generation
- Controlling loads as per either operational conditions or financial incentives (through, e.g., time of use or real-time pricing)
- Enabling new solutions for improved customer service, reliability, and future offerings.



3.1 Smart Grid's elements:

Electric power flow in a Smart Grid is monitored and controlled with the help of various elements on real-time basis which helps in automation and coordination of power flow from generation to consumer's point. A smart grid can mainly be divided into

- Power - Generation, Transmission, distribution and Control,
- Communications-Telecom, Internet, Protocols and data management.

3.2 Technology overview:

The smart Grid network which can bring together three kinds of technologies for transmission and distribution of electric energy is defined as under;

3.2.1 Advanced Hardware:

The following constitutes advanced hardware:

- Advanced monitoring and control devices,
- Advanced metering systems/ smart meters,
- Advanced Motors & transformers,
- Advanced sensors/ smart appliances,
- Renewable energy sources,
- Advanced power electronics,

3.2.2 Advanced software/Systems:

The following comprises of advanced software/ systems functionalities which are depicted on front page;

- Integrated service providers software,
- Energy Management Systems,
- Distribution Management Systems,
- Intelligent Network Agent,
- Power monitoring and control systems,
- Assets and Workforce management.

3.2.3 Advanced Resources:

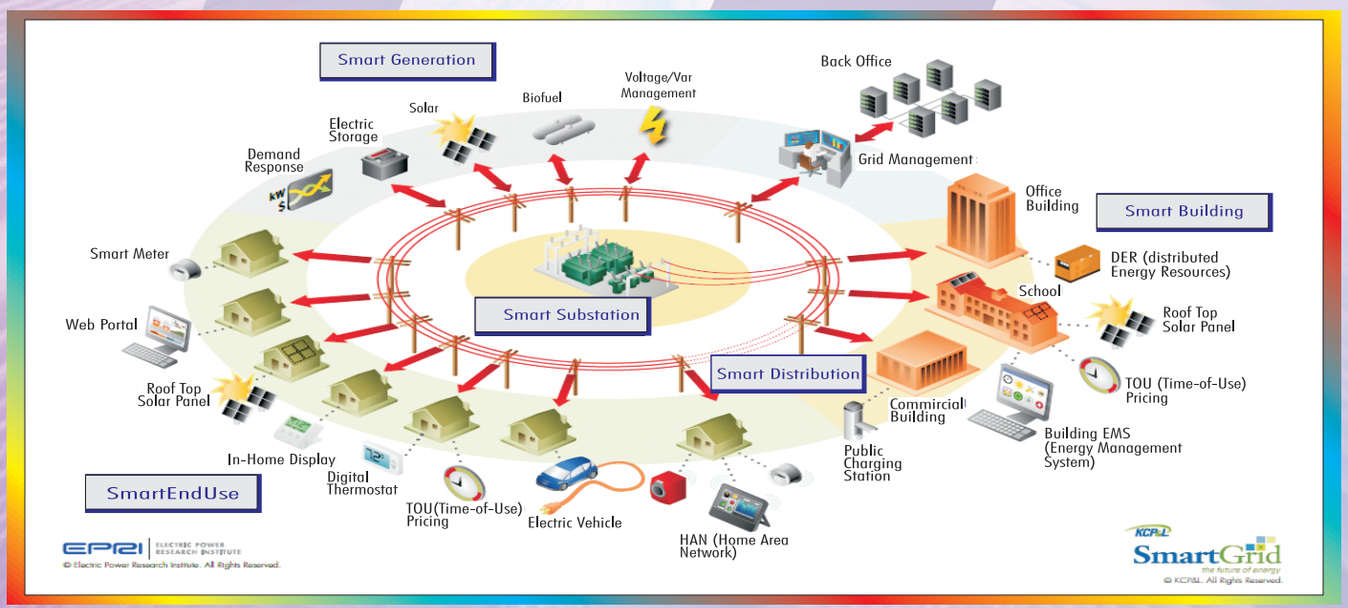
The following consists of advanced resources;

- Advanced cables,
- Advanced energy storages,
- Trained Manpower,

4.0 Standards and Protocols:

There are various institutions developing standards to cater the need of smart grid. Some of the developing standards are as under:

4.1 IEC has created a family of standards IEC TC 57 which develops and maintains International Standards for power systems and systems including Energy Management Systems (EMS), Supervisory Control and Data Acquisition (SCADA), distribution automation and others associated information in real-time. The family of these standards includes IEC 61850 which is architecture for sub-station automation, and IEC 61970/61968 for the Common Information Model (CIM) which is used for turning data into information. IEC TC 57 is a state of the art communication architecture to provide full interoperability and to avoid superfluous intermediate data model conversions.



4.2 IEEE P2030 is an IEEE project developing a draft guide for Smart Grid Interoperability of Energy Technology and Information Technology Operation with the Electric Power System (EPS), and End-Use Applications and Loads. This project will develop open standards to empower energy consumers and drive rapid integration of renewable energy sources and other intelligent systems. IEEE P2030 is developing in such a way which permits two ways power flows with communication and control and promote a more reliable and flexible electric power system.

4.3 G.hn (Next Generation Home Network standard) is another standard of home network technology family, developed by the ITU Standardization arm and promoted by the Home Grid Forum. It defines networking over power lines, phone lines and coaxial cables with data rates up to 1.0 Gbit/s. In OFDM systems, the transmitted signal is split into multiple orthogonal subcarriers. G.hn modulates each subcarrier by using 12-bit QAM. G.hn supports maximum 4096-QAM constellation. G.hn Media Access Control is based on time division multiple access architecture in which a domain master schedules during Transmission Opportunities (TXOPs) can be used by one or more devices in the domain. Most of the elements supported by G.hn standard are common in all three media which includes media-specific optimizations to ensure that performance is maximized while operating over each media.

5.0 Advantages:

The action based on of real-time information is a crucial factor in a smart grid. Many activities can be managed with the help of real-time information within the electrical network. Few of them are as under;

Self-healing: A smart grid embedded with information and communication technology (ICT) detects and responds to system problems automatically on real-time basis to avoid power outages, power quality problems, and service disruptions. It can also feed the power from the standby mode in case of failure of power. This is called as self-healing.

Response to incidents: Fundamentally, a smart grid can respond to any incident taking place in the consumer's site or in the network which is affecting the flow of power in the networks. There can be various reasons for the occurrence of such incidence like failure of any of the elements working in the network, overloading or overheating of components, disturbance in the network etc.

Load readjustment: A smart grid embedded with ICT and control facility can readjust the load for optimum utilization of stable power in efficient manner to meet demand and supply. Power consumption demanded by consumers can be worked out on the basis of previous trends which require standby generating plants for minimum requisite power supply due to rapid change in power consumption.

6.0 Smart Grid Policy of India:

Ministry of Power (GOI) has decided to transform India's electric network into India's Smart Grid Network due to various policy decisions like;

To implement the law concerning with RGGVY (Rajiv Gandhi Grameen Vidyutikaran Yojana)

- .To implement policy decision on Smart Grid related national energy policy.
- To build a modern and intelligent Smart Grid to provide a stable environment for investments in electric infrastructure.
- To increase load needs as one of the world's fastest growing economies,

- The need to optimize electrical usage by being able to manage loads and mitigate operating inefficiencies.
- To integrate non-conventional energy sources like solar, wind mills in efficient and planned manner.

6.1 Smart Grid Efforts:

Smart Grid policy of our country is an emerging part of its nationwide energy policy. The policy is being jointly developed by a collaborative grouping of central and state governmental bodies and subject matter experts from industry, academia and non-governmental research and development organizations. India's Smart Grid efforts primarily concern three main issues given as under

- To address increased load needs for world's fastest growing economy,
- To electrify a large segment of rural population,
- To optimize electrical usage to manage loads and mitigate operating inefficiencies.

6.2 Smart Grid Task Force:

Ministry of Power (GOI) has set up an inter ministerial group which is called as Smart Grid Task Force (SGTF) to evolve a roadmap for implementation of Smart Grid in India. Ministry of Communication & Information Technology (GOI) has been nominated as one of its representative in SGTF to address issues on development of standards, cyber security, testing and certification etc.

6.2.1 Working Groups:

Smart Grid Task Force is divided into 5 functioning workgroups having different functions including Security and standards. These are:

- WG1–Trials/Pilot on new technologies.
- WG2– Loss reduction and theft, data gathering and analysis.
- WG3– Power to rural areas and reliability & quality of power to urban areas.
- WG4 – Dist. Generation & renewable.
- WG5– Physical cyber security, Standards and Spectrum:

6.3 India Smart Grid Forum:

India Smart Grid Forum, a recommending body is non-profit voluntary consortium of public and private stakeholders, research institutions and selected utilities on smart grid technologies.

7.0 Conclusion:

Ministry of Power (GOI) has already taken initiative to make India's Power Network as Smart Grids and has formed various forums and working groups for finalizing technologies. In the mean time, implementation can be initiated by upgrading distribution networks, shortening long transmission lines, decentralizing large capacity generation plants, integrating renewable energy resources etc to reduce power losses.

India's Smart Grid will fulfil the need of the nation in many ways like it will provide reliable power supply at low cost, reduce the loss of power, optimize the utilization of energy, improve the usage of renewable resources etc. Further, it will further improve national economy by reducing loss of power and boost the industry.

References:

www.powermin.nic.in
www.isgtf.in
www.cstep.in
Images Courtesy EPRI

Special Events

Sh. Anil Kaushal took over as Sr DDG TEC on 12/12/2011 on superannuation of Sh N.K. Srivastava. Sh Kaushal belongs to ITS 1975 batch. He has over 34 years experience of working in telecom sector. Earlier he has served as CGM Northern Telecom Region of BSNL and CGM of Himachal Circle besides working in various capacities in BSNL, DoT HQ & Ministry of IT.

Other Activities

- TEC participated in ITU SG-15 meeting held at Geneva, Switzerland in the month of December 2011. SG-15 deals with Optical transport networks and access network infrastructures.
- A presentation was given by TEC on 'Indian contribution on Deep Packet Inspection' in ITU-T Study Group 13 held in October 2011 at Geneva. Study Group 13 leads ITU's work on standards for next generation networks (NGN) and future networks
- TEC participated in ITU-R working Party 5D meeting held at Goa.
- TEC participated in ITU-T Study Group 11 meeting at Geneva in October 2011. ITU-T Study Group 11 deals with Signalling requirements, protocols and test specifications.
- TEC participated in the meeting on 'Standard Operative Procedure (SOP)' for coordination of Telecommunication support and provision of service during emergency of natural disasters .
- Meeting held with Nav 6 delegation from Malaysia for IPv6 implementation and for co-operation between India & Malaysia.
- TEC made a presentation on 'Standardisation in India' in ITU-T workshop at Delhi.
- TEC made a presentation on 'Mobile Backhaul' Mobile Backhaul Summit held at New Delhi in November 2011
- White paper/ technical paper released on
  - Ultra Wideband Technology
  - Requirements of network virtualization
  - Machine to machine communication
  - Deep Packet Inspection
  - Wi-Max migration from release 1 to release 2

हिन्दी कार्यशाला

दूरसंचार इंजीनियरी केन्द्र द्वारा दिनांक 28 दिसम्बर 2011 को हिन्दी व्याकरण एवं श्रुत लेखन सॉफ्टवेयर विषय पर कार्याशाला का आयोजन किया गया। श्री विक्रम सिंह, केन्द्रीय हिन्दी प्रशिक्षण संस्थान, राज भाषा विभाग, गृह मन्त्रालय, नई दिल्ली, द्वारा इस कार्यालय में व्याख्यान दिया गया तथा व्याकरण के मूल सिद्धान्तों एवं दैनिक व्यवहार में श्रुत लेखन सॉफ्टवेयर के उपयोग पर प्रकाश डाला। यह कार्यशाला हिन्दी में काम करने की दृष्टि से बहुत ही उपयोगी सिद्ध हुई।

कार्यशाला में भाग लेते हुए अधिकारी एवं कर्मचारीगण

Approvals from October 2011 to December 2011

	Company/Product
1	Tejas Network Limited
1.1	STM-4 TM/ADM, TJ 100ME
2	ECI Telecom India (P)Limited
2.1	SDH-STM-1, XDM 50(SDH)
2.2	SDH Multiplexer,STM-1,XDM 500
2.3	SDH Multiplexer, 2Mbit/s Interface, XDM 500
2.4	SDH Multiplexer, XDM-2000
2.5	Radio PDH Multiplexer,Wave-10
3	Avaya India Private Limited
3.1	IP PABX, CS-1000
4	Sunren Technical Solutions (P) Ltd
4.1	G-3 FAX Machine, SCX-4728 FD
4.2	G-3 FAX Machine, SCX-4729 FW
4.3	G-3 FAX Machine, SCX-3406 F
4.4	G-3 FAX Machine, SF 761 P
4.5	G-3 FAX Machine, SCX-3401 F
4.6	G-3FAX Card, LEX-M03-002
4.7	G-3 FAX Machine, SCX-3406 FW
4.8	Black Berry 9360 Smart Phone Wireless Handheld,RDX71VW
4.9	Terminal Connecting PSTN,Converge PRO TH 20
4.10	Terminal Connecting PSTN,Converge PRO 880T
4.11	Terminal Connecting PSTN,Converge PRO 840T
4.12	Switching Node with 2 Mb/s , UMG 8900(Media Gateway),SG 7000 (Switching Gateway)
4.13	Switching Node with STM-1, UMG 8900(Media Gateway),SG 7000 (Switching Gateway)
4.14	G-3 FAX Machine, SCX-4727-FD
4.15	Black Berry 9790 Smart Phone (REC 71 UW)
4.16	Black Berry 9380 Smart Phone (REA 71 UW)
5	Accord Communications ,Meerut
5.1	Digital PABX, ADX 600
6	CDOT, New Delhi
6.1	CDOT G-PON Systems
8	Hewlett Packard India Sales(P) Ltd.
8.1	Router, HP A-MSR 30-60
8.2	Router, HP A-MSR 50-60
8.3	Router, HP A-MSR 30-40
8.4	G-3 FAX Card, BOISB-0703-00
8.5	G-3 FAX Machine, SNPRC-1102-01
9	IBM India Private Limited
9.1	Router, IBM J11M
9.2	Router, IBM J06M
10	Motorola Mobility India (P) Ltd.
10.1	GSM Mobile phone, Motorola XT 910 (MOC2E)
10.2	GSM Mobile phone, Motorola EX-226(MOC3A)
10.3	GSM Mobile phone, MB 860 (MVR06-33334411A11)
11	NEC India (P) Limited
11.1	Indoor Unit(IDU) for Point to Point MR System, MDP-34 MB-27C
11.2	Indoor Unit(IDU) for Point to Point MR System, MDP-34MB-28C
11.3	Indoor Unit(IDU) for Point to Point MR System, MDP-400MB-IAA
12	Nokia India Private Limited
12.1	Otical Fibre Splicing Machine, TCW-505
12.2	Nokia Bluetooth Head Set, Play 360 (MD-50W)
12.3	Nokia Bluetooth Headset,BH-112
12.4	Nokia Bluetooth Head Set,MD-20W
12.5	GSM Mobile phone, Nokia C5-05 (RM-815)
12.6	GSM Mobile phone, Nokia 603 (RM-779)
12.7	GSM Mobile phone, Nokia 303 (RM-763)
12.8	GSM Mobile phone, Nokia 200 (RM-761)
12.9	GSM Mobile phone, Nokia C5-06 (RM-816)
12.10	GSM Mobile Handset,Nokia 710 (RM-803)
12.11	GSM Mobile Handset,Nokia 800 (RM-801)
12.12	GSM Mobile phone, Nokia X2-02 (RM-694)
13	Nokia Siemens Networks Limited
13.1	Media Gateway Controlled STM-1 & E-1, Soft Switch hiE 9200, MGW 1200 hiG
13.2	Switching Node with Networks at 2048 Kbit/s,Open MSS
14	Prima Telecom Limited, Noida
14.1	2Mbps Line Driver, Loop H 3310
15	Renishaw Metrology System(P) Ltd
15.1	Bluetooth Device, XR-20-W
16	Seven Hills Opticommunications(P) Ltd
16.1	Optical fibre Cleaver (Precision),TC-300

Important Activities of TEC during Oct 2011 to Dec 2011

DCC Conducted on

- GR on Signaling Gateway
- IR of Sigtran

GR/IR Revised

- GR on Signalling Transfer Point
- GR on Flexible Multiplexer
- GR on E.M.F Strength Measuring Instrument
- GR on BTS Shelter
- GR on Thermoshrink Sleeve Closure channel and branch off clip
- IR on STM-1,STM-4,STM-16,STM-64 and STM-256 signals between different networks

New GR issued on

- Remote RF Monitoring System
- ADSS Optical Fibre Cable for laying along power line alignments
- OPGW Cable for laying on power line

TSTP Issued on

- BTS Shelter
- Demonstration of deliverable of pilot project of M/s Tulip for virtural POP- prototype
- GR on ADSS Optical Fibre Cable for laying along power line alignments
- GR on OPGW Cable for laying on power line
- SMPS based Power Plant
- 2 Mbps versatile Multiplexer
- PLB HDPE ducts for use as underground optical fibre cable conduits

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TEC Conducts
Type Approval
Interface Approval
Certificate of Approval
for
Telecom Products

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Approvals issued by TEC during the period from October 2011 to December 2011

Interface Approvals.....34
Type Approvals 02
Certificate of Approvals.....19

Activities at National Telecommunications Institute

- Conducted three days workshop on IPV6 in association with APNIC
- Conducted one day workshop on IPV6 awareness
- Conducted two days workshop on Mobile phone Technology for NIA,Hyderabad
- Conducted one day seminar on Smart Grid: Opportunities & Challenges
- Conducted two days workshop on CMS and Security aspects of Telecom networks

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जनवरी 2012
भाग 16
अंक 1

दूरसंचार इंजीनियरी केन्द्र
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