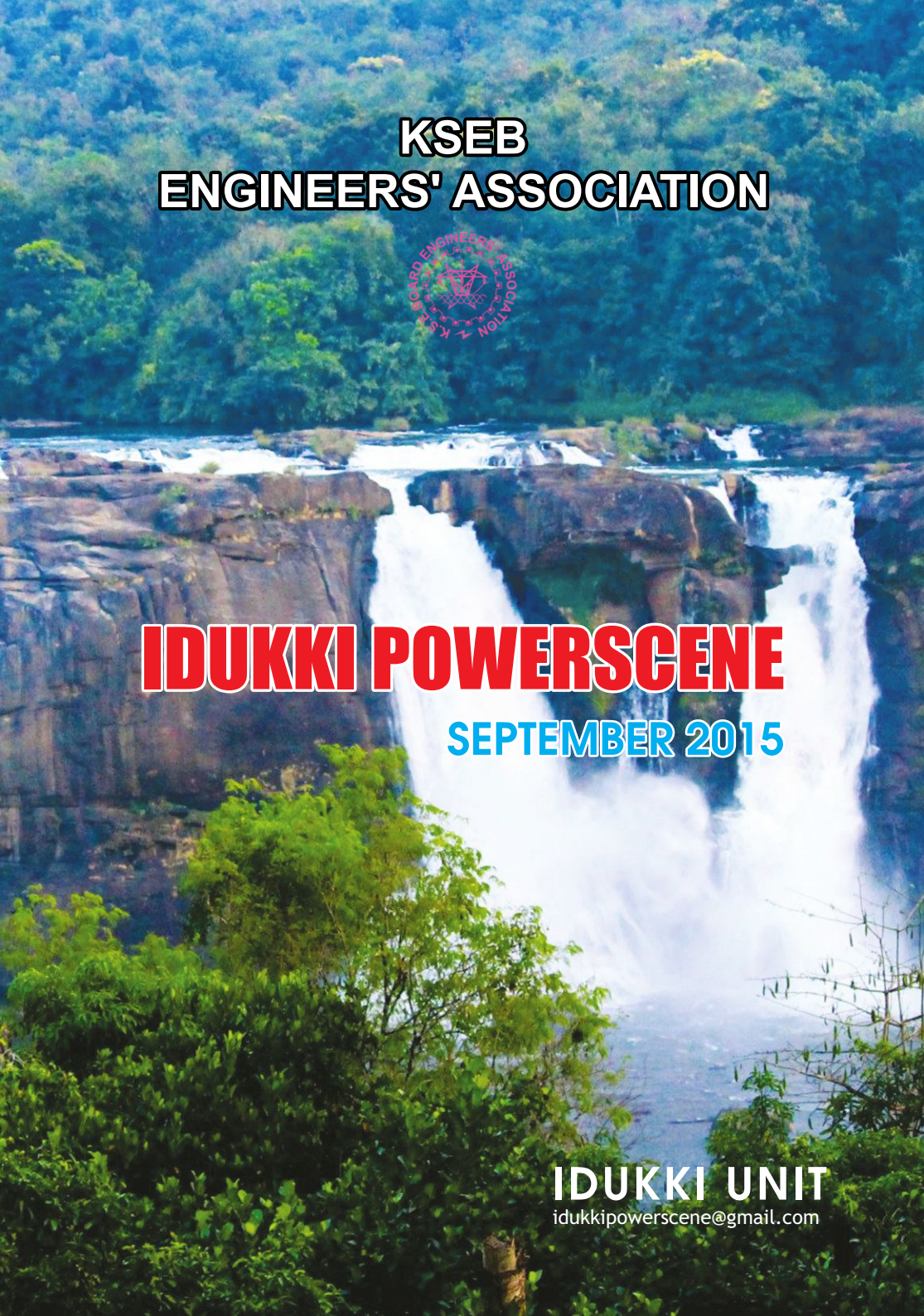
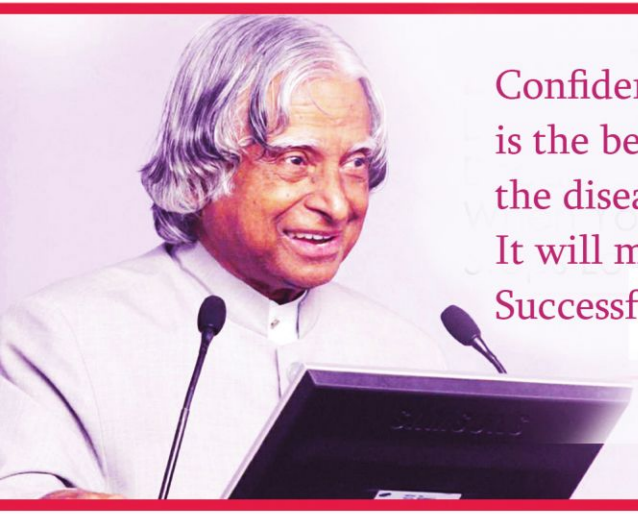
KSEB
ENGINEERS' ASSOCIATION



IDUKKI POWERSCENE

SEPTEMBER 2015

IDUKKI UNIT
idukkipowerscene@gmail.com



Confidence and Hard-work
is the best medicine to kill
the disease called Failure.
It will make you a
Successful Person

Dr. APJ Abdul Kalam
1931- 2015

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PRESIDENTIAL ADDRESS

Dear Engineers,

Dear Engineers, after completing a quarter of water year the storage of dams under KSEBL is very poor. Due to shortage of rainfall in the project area, inflow to the dams is very poor compared tothe previous years, which may lead to the condition that the power position in oncoming summer is very crucial. The storage level of Idukki Reservoir is 57.09%. The contribution of hydro power to the Kerala Grid is less than 20% compared to previous years and the total storage capacity of the dams of the KSEB Ltd is less than 15 % compared to previous year. Due to objectionsfrom the environmentalists weare able to constructonly small hydro schemes for the last 15 years. It is true that it will support the Kerala Power Sector during rainy seasons only. Most of the water haveover flowed withoutenergyutilisation.Actually KSEB Ltd needs storage dams and the stored water can be used for the summer season. This may lead to the construction of large power projects in the Kerala under KSEBL.Otherwise we have to purchase power at higher rates, which causes high costof living to the people and Kerala Industry. The industries in Keralawill choose alternatives to reduce their cost of production. This may lead to the companies shifting to outside Kerala.

Your's Faithfully,
sd/-
Chairman

Editorial Column

India is facing a formidable challenge to build up its energy infrastructure fast enough to keep pace with changing lifestyle patterns. Driven by India's strong economic and population growth , energy requirements have risen sharply in recent years, and the commercial energy supply will have to increase at least three to four times by 2031-2032.

Of the total energy supply, around 64.3 percent is generated by fossil-fuel (coal, gas and diesel), 23.1 percent hydropower, 2.9 percent nuclear power, and 9.7 percent renewable energy. Renewable energy includes small hydropower plants, biomass gasification, biomass energy, urban and industrial waste energy, solar energy and wind energy.

Till recently Kerala has been depending solely on hydro-power for electricity, availability of which is limited, due to lack of technically favorable sites and un favorable ecological impacts. Nuclear power and fossil fuel-fired thermal stations are the other conventional sources. Owing to widespread popular opposition, because of high population density and fragile ecology, nuclear stations could not be installed in Kerala. The other alternative was fossil-fuelled thermal stations like Brahmapuram /Kayamkulam, which is also not capable of providing all our energy needs.

As fossil fuels are limited, they do not offer a long term solution. They also contribute to global warming. The uncertainties of monsoon and the growing demand for energy have resulted in a significant energy deficit which is growing year by year.

In order to cater the ever-increasing demand of power, energy generation from municipal waste, agro waste, industrial waste, and sewage and other biomass, small-hydel units, solar photo voltaic, wind, tide, wave, geothermal etc has to be implemented. These technologies are environment friendly.

Kerala's wind potential is 1171 MW of which only 2% is utilized so far. ANERT has installed the first 25 kW Grid Interactive Solar PV Power plant of the State during March 2001 at Vydyuthi Bhavanam, Kerala State Electricity Board. The airport at Nedumbassery (CIAL) purely runs with Grid Connected solar power.

The use of Municipal Solid Waste for power generation, besides generating power, will eliminate the problem of pollution and disposal of urban waste. Kerala is blessed with abundant renewable sources that could be utilized in multiple forms to provide adequate energy and essential modern amenities to people of Kerala. Most of these are also significant as potential sources to support and strengthen the existing power grid or to reduce our dependence on the fast depleting fossil fuels.

Secretary's Desk

Kerala has been blessed with an abundance of natural resources like sunlight, wind, water etc. The State has been harnessing energy from the rivers in hilly terrains which are ideal locations for hydro-power stations. Until a decade ago, the energy from these hydropower stations was sufficient for the requirements of the State. However with growth in industry and changes in the domestic front like an increased dependence on new generation home appliances, there was an increase in energy requirements. The State has a storehouse of hydropower that can be tapped but greater concerns about its effects on the environment have caused the State to look at other viable forms of energy, particularly renewable energy. From among the various sources of renewable energy available for power generation, energy from wind power has emerged as the most promising source. It is estimated to be the most viable and cost effective option for grid connected power generation.

It is important to mention here that even though the wind energy potential of Kerala was identified years ago, there were no remarkable efforts made to harness it. The reasons for this are many, beginning with the geography of the sites to the fact that the State was enjoying the benefits of abundant and cheap hydro power.

The Agency for Non-conventional Energy and Rural Technology (ANERT), conducted many studies throughout the State for identifying potential sites for wind power generation. So far, 17 sites with wind density of above 200 W/m2 (or wind speed above 15 km/h) have been identified. The presently identified sites are spread out in the districts of Idukki and Palakkad with Ramakkalmedu in Palakkad having the second highest wind density in India after Jogimatti in Karnataka. Out of the 17 sites, a micro survey was conducted in seven sites and the results were very encouraging with an estimated potential of 754 MW.

The KSEB Ltd has to modify the renewable energy policy so as to conduct the wind power projects under the KSEB Ltd. Also survey is to be carried to tap more wind power potential so that our state will be able to harness its resources in the best way possible for a brighter tomorrow.

Your's Faithfully,

sd/-

Rajasekhar Rao T.R.

KSEB AT A GLANCE

Er. Naveen T R

Engineering community in KSEB celebrated Engineers Day on September 15 as a tribute to Er.Mokshakundam Visvesvaraya. Our engineers in IHEP also showed their professionalism and commitment in running the powerhouse on the day of strike on September 2. The powerhouse functioned normally without the cooperation of some engineers and workmen who were part of that strike. KSEBL has decided to levy fine from the consumers, if the officials are not able to record the metre reading even after visiting the house twice. If the officials are not able to record the reading more than two times, then they can levy a fine of Rs 250 from single phase owners and Rs 500 from three phase owners. Consumers using high-tension would be levied a fine of Rs 5,000. This makes lot of discussion in social medias and later board decided to withheld the same due to heavy objections from the public. Several anomaly transfer orders of AE, AEE and EE were came along with the three AEE-EE promotion orders. Referendum for workmen category is also scheduled to conduct on 20-10-2015.

Dedication of the Adyanpara Small Hydro Electric Project (3.5MW) to the nation was also witnessed by KSEB Ltd. along with the inauguration of Adyanpara Hydel Tourism Project by Shri. Oommen Chandy, Hon'ble Chief Minister of Kerala in this month. Hon'ble Minister for Electricity was also inaugurated Malabar Heaven Boating & Recreations (Kakkayam Boating Center)

Long Term Statutory Training Program on Transmission for Power Engineers is going to be conducted at PETARC, Moolamattom, based on Regulation No.7 of the CEA Regulations 2010. The training program is conducting as per the syllabus approved by the Central Electricity Authority. Training for the second batch is proposed to commence shortly. Assistant Engineers (Electrical) with minimum 10 years remaining service are invited. Minimum qualification for attending the training is Diploma in Electrical Engineering with high Second Class. The training schedule consists of 10 modules of 8 days duration each month.

Kerala State Electricity Board Limited accorded permission to M/s Reliance Jio Infocomm Ltd for drawing Aerial Optical Fibre Cable through the distribution poles of KSEB Ltd only for the limited purpose of providing 4G services, by collecting rent , for a period limited to maximum of 5 years. This is as a purely temporary measure and not to be extended further under any circumstances, on a non-exclusive basis, subject to proposed terms and conditions. The pole rental charges for M/s Reliance Jio Infocomm fixed in the negotiation meeting was Rs. 1800.10/pole (for five years) in urban/semi urban

areas & Rs. 900.05/pole (for five years) in rural areas. Accordingly as requested by M/s Reliance Jio Infocomm Ltd for the drawal of OFC through 12533 Nos. of distribution poles of KSEB Ltd, an amount of Rs. 2,53,49,150/- was collected from M/s Reliance Jio Infocomm Ltd by the Chief Engineer(Distribution-South).

Order put by former Director (Generation & HRM) for avoiding the shortage of technical staff in generation wing was modified by Full board meeting. Some of the clauses were cancelled by the new order. Another important order in this month was revised delegation of powers of executives of KSEBL. As per the revised delegation of powers, Assistant Engineers were delegated with the powers to arrange labour contracts on limited quotation and issue work orders to the extend of Rs. 20,000 . It is also decided to increase the monetary limit for exempting works and supplies arranged through limited quotations from executing formal agreements to Rs 20,000 from the present value of Rs. 10,000.

Board of directors ordered to designate Executive Engineer, Electrical Circle as Safety Coordinators instead of Assistant Executive Engineer of Electrical Circle with the same duties and responsibilities. Earlier Assistant Executive Engineer of Electrical Circle functioned as Safety Coordinator, who has to co-ordinate, monitor and control the activities of safety officers [AEEs of Electrical Sub Divisions, inspect accident sites, conduct frequent site inspections, surprise inspections, identify the requirement of safety materials and personal protective materials etc.

The order for Security deposit for energy meter received a lot of attention in this month. The amount proposed as security amount is the cost of meter itself. This was introduced to encourage the consumers to purchase the meter by themselves as far as possible, since in such cases the entire meter rent will be exempted from their monthly bills. Further, to avoid difficulty to existing consumers, it was proposed that the security deposit is intended for new connections and at the time of replacement of meters of existing consumers only. The above provisions are to be included in the software package during implementation of miscellaneous charges. The interest portion of the security deposit shall be deducted from monthly/bi-monthly rent charges of energy meter of the consumer in regular monthly/bi-monthly energy bills. The provision for collection of security deposit shall be included for applications for new connections from 1.9.2015 onwards and at the time of replacement of existing meters only, for which adequate or no security deposit has been initially collected.

The water storage in hydroelectric projects are not much hopeful. The intermittent rain keeps the storage in Idukki dam in and around 55%. The Maximum Consumption and Maximum Demand in this month was 3518(on 01-09-2015) MW and 66.01MU(on 01-09-2015) respectively.

We welcome your valuable articles to idukkipowerscene@gmail.com

Synchrophasor Technology –Devices (PMUs) and Applications

Er. Pradeep S.V.

Part II

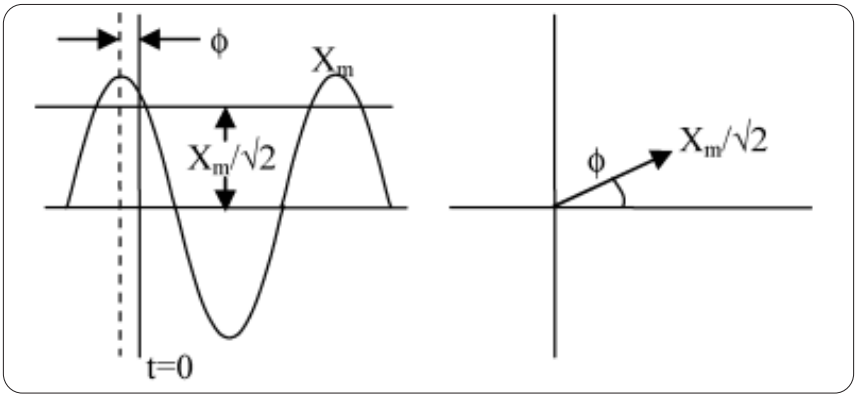
In the last part we discussed the drawbacks of the present SCADA system which lead to the new technology using PMUs. In this session we will discuss the basics and operation of the Synchrophasor technology.

What is a phasor?

A phasor is a complex number that represents both the magnitude and phase angle of the sine waves found in electricity. Phasor measurements that occur at the same time are called "synchrophasors", as are the PMU devices that allow their measurement.

A pure sinusoidal waveform can be represented by a unique complex number known as a 'phasor'.

We have the equation for a sinusoidal signalas $x(t)= X_m \cos(\omega t+\phi)$. The phasor representation of this sinusoid is given by



Sinusoidal representation
$x(t)= X_m \cos(\omega t+\phi)$

Phasor representation
$x(t)= Re\{X_m e^{j(\omega t+\varphi)}\}$

Figure-3

We have the Euler's equation as $e^{j\theta} = \cos\theta + j\sin\theta$

Thus $e^{j(\omega t+\varphi)} = \cos(\omega t+\varphi) + j\sin(\omega t+\varphi)$

Also $X_m e^{j(\omega t+\varphi)} = X_m\cos(\omega t+\varphi) + j X_m\sin(\omega t+\varphi)$

This means if we take the real part of phasor representation we get the required signal.The most commonly used method of calculating phasors from sampled data is that of Discrete Fourier Transform (DFT).

Both Kirchoff'sVoltage Law and Kirchoff'sCurrent Law hold when working with phasors in circuits operating in sinusoidal steady-state. This implies that all of the circuit analysis methods (mesh and nodal analysis, source transformations, voltage & current division, Thevenin equivalent, combining elements, etc,) work in the same way for resistive circuits. The only difference is that we must work with phasor currents & voltages and the impedances &/or admittances of the elements.

Functional Block diagram

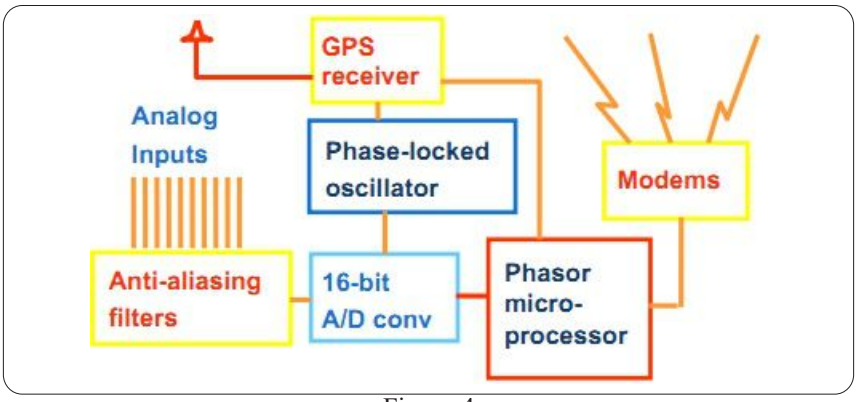
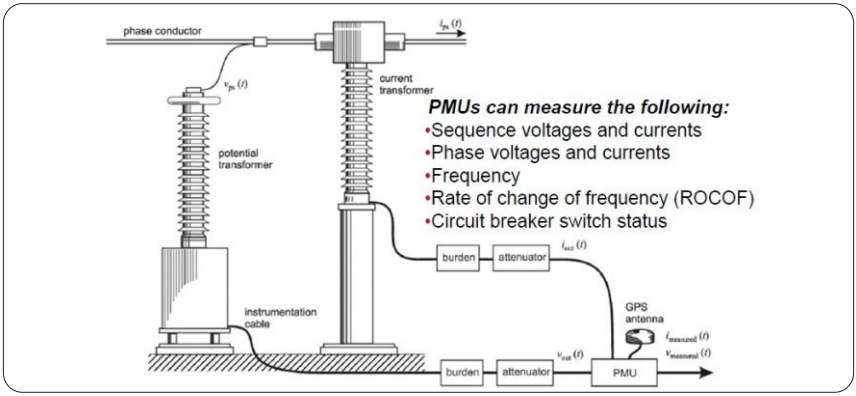


Figure-4

A PMU can measure 50/60 Hz AC waveforms (voltages and currents) typically at a rate of 48 samples per cycle (2400 samples per second for 50Hz systems).The analog AC waveforms are digitized by an Analog to Digital converter for each phase. A phase-lock oscillator along with a Global Positioning System (GPS) reference source, provides the needed high-speed synchronized sampling with 1 microsecond accuracy. The resultant time tagged phasors can be transmitted to a local or remote receiver at rates up to 60 frames per second.PMU rely on a GPS time signal for extremely accurate time stamping of the power system information.

A GPS satellite receiver provides a precise timing pulse, which is correlated with voltages and currents at principal intersecting locations (critical substations) on a power grid and can output accurately time-stamped voltage and current phasors. Critical substations are preselected through various studies to make extremely accurate phase angle measurements which indicate shifts in system (grid) stability. The phasor datain a format defined in IEEE standard 1344 [2] is collected either on-site or at centralized locations using Phasor Data Concentrator (PDC) technology. Because these phasors are truly synchronized, synchronized comparison of two quantities is possible in real time. These comparisons can be used to assess system conditions-such as; frequency changes, MW, MVARs, kVolts, etc.The data is then transmitted to a regional monitoring system which is maintained by the local Independent System Operator (ISO). These ISOs will monitor phasor data from individual PMU's or from as many as 150 PMU's. This monitoring provides an accurate means of establishing controls for power flow from multiple energy generation sources.



Instrumentation including a PMU

Figure-5

The following figure shows how PMU is being used in a power system

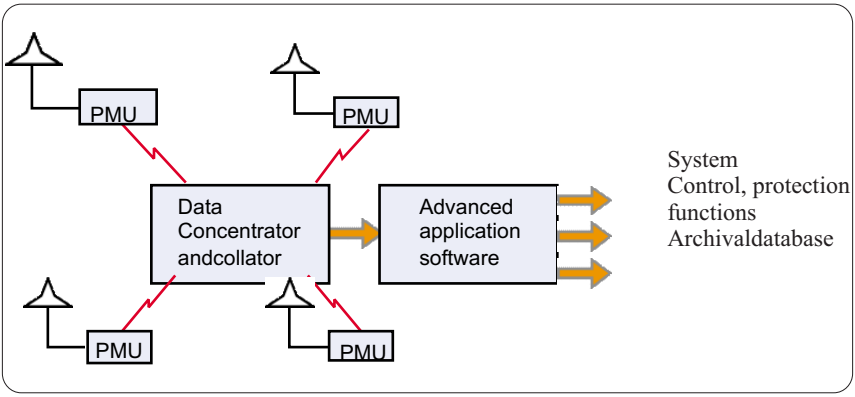


Figure-6 PMU utilisation in a Power system

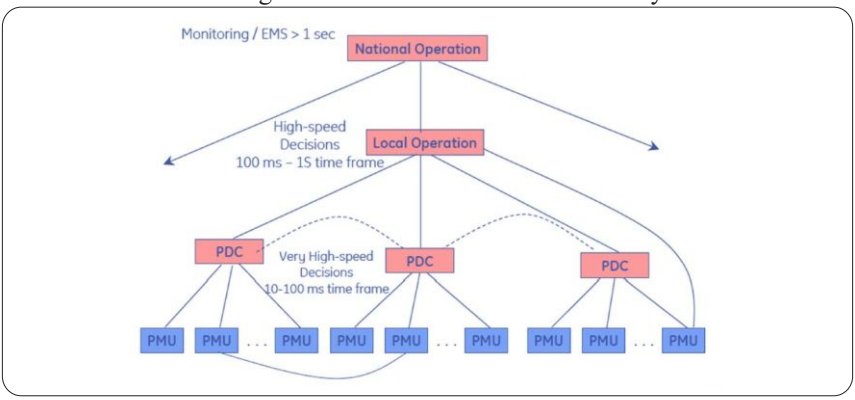


Figure-7 Typical architecture of synchrophasor data to and from PMUs

Global Positioning System

The Global Positioning Satellite(GPS) system consists of 24 satellites in six orbits at an approximate altitude of 10,000 miles above the surface of the earth. They are thus approximately at one half the altitude corresponding to a geo-synchronous orbit. The positioning of the orbital plane and the positioning of the satellite sin the orbits is such that at any given in stant atleast four satellites are in view from any point on the surface of the earth. Often, more than six satellites are visible. The civilian-use channel of the GPS system transmits positional coordinates of the satellites from which the location of a receiver station on earth could be determined. Inaddition, the satellites transmit a one-pulse- per-second signal, along with an identifier for the signal that can be interpreted by the earth

station receivers. The civilian-use transmission of the time signal is precise to within 1 micro second, and often in practice is foundtobemuch more accurate. The time pulse is of critical importancetothePMU related application.Thenormal practice is to phase-lock a sampling clock to this pulse. The sampling instant would be identified as the pulse number within a one-second intervalidentified by the GPS time-tag. The exact format for time-tagging is defined in IEEE standard 1344[2]. It should be mentioned that a time standard known as the IRIG-B (Inter Range Instrumentation Group) standard is currently being used by the power industry for time-tagging digital fault recorders and other substation event monitoring systems. However, with standard IRIG- Breceivers the synchronization accuracy is of the order of 1 milli second, which is not enough for precise power system measurement (a tolerance of 1 millisecond corresponds to an uncertainty of about 20°).

How PMUs are time synchronised?

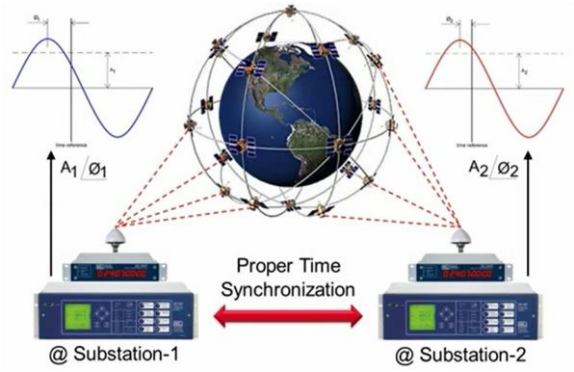


Figure- 8 Time synchronisation between two stations using GPS

The difference φ1-φ2 determines the power flow from one station to the other. By controlling the difference the control centre can effectively control the power flow or even reverse it also!

POWER SYSTEM PROTECTION

Er. L. Manoj Gopal

How to select the required CT Ratio/CT Parameters?

Usually we select a C T ratio near to the actual current in the circuit where the CT is to be commissioned. This will help us to get a readable and accurate value in the ammeter. Also the relay setting will be easier for electromechanical relays because the available plug setting (set value) available in the relay is very limited. But by the advent of numerical relays , any plug setting can be given in the relay.

In foreign countries even the C T selection is also based on the fault current and CT saturation current at connected burden in addition to the normal current in the circuit. The **client or the consultant will do the calculation to arrive at the required CT ratio.** In KSEBL I don't think that the CTs are selected based on these scientific methods even for very important /critical installations.

Let me illustrate one such calculation below for interested readers.

The calculation is regarding the selection of a CT for an 11kV Auxiliary Transformer feeder. Let the

Aux Transformer is of the rating 500 kVA.

Suppose we have two CTs available having parameters

1) 100/1, Class 5P15,15 VA,RCT =2 ohms.

2) 200/1, Class 5P 15, 15 VA,RCT = 2 ohms.

The full load current of the feeder is 500*1000/(1.732 *11*1000) = 26.24A

From the above calculation we think that 100/1 CT is the best option. Now you go through the following calculation, and check whether our thinking is correct. Let the relay used is a numerical over current and earth fault relay having a very low burden (say 0.025 VA). Let the fault level on the 11 kV bus of the station is 18.4 kA (IF).

CASE 1

CT Ratio = 100/1A

Accuracy Limit Factor, Kn ALF = 15

Loads connected to CT = Numerical O/C and E/F Relay (51/51N) = 0.025 VA

Lead burden is assumed negligible as it is only interpanel wiring.
Total external burden Pt = 0.025 VA
CT internal resistance RCT = 2 ohm
Normal Secondary current =In = 1A
Hence Internal Burden Pi =In *In*RCT= 1*2 =2VA
Total Burden Specified (external), P = 15 VA
CT saturation current at rated burden = Is=100*KnALF =100*15 = 1500A
CT saturation current at connected burden = {(P+Pi)/(Pt+Pi)}* Is
= {(15+2)/(0.025+2)}*1500 = 12.59kA.
So the CT saturation current at connected burden is lower than the actual fault current of 18.4 kA. So if this ratio CT is used ,the core will be saturated and will not transform the actual fault current in the relay.

CASE 2

Considering the second CT with parameters 200/1, Class 5P 15, 15 VA,RCT = 2 ohms, let us do the calculation once again.
Loads connected to CT = Numerical O/C and E/F Relay (51/51N) = 0.025 VA
Lead burden is assumed negligible as it is only interpanel wiring.
Total external burden Pt = 0.025 VA
CT internal resistance RCT = 2 ohm
Normal Secondary current =In = 1A
Hence Internal Burden Pi =In *In*RCT= 1*2 =2VA
Total Burden Specified (external), P = 15 VA
CT saturation current at rated burden = Is=200*KnALF =200*15 = 3000A
CT saturation current at connected burden = {(P+Pi)/(Pt+Pi)}* Is
= {(15+2)/(0.025+2)}*3000 = 25.19kA.
So the CT saturation current at connected burden is higher than the design fault current of 18.4 kA
So the ratio of 200/1 is the best option than the 100/1 ratio.

CT Dimensioning Check.
For Protection class CT, the dimensioning check is carried out to ensure that the design value of CT secondary voltage is greater than the actual voltage on CT

secondary.

Design voltage across CT > Actual voltage required

VDESIGN> VACTUAL

Relay Burden RR = 0.025

Lead Resistance RL is negligible as it is interpanel wiring

VACTUAL= IF*(Pi+2RL+RR) = {(18.4*1000)/200}*(2+0.025) = 186.3V

VDESIGN={(Pi*ALF)+(BURDEN*ALF)}*IRAT(secondary)

={(2*15)+(15*15)}*1A= 255V

VDESIGN is greater than VACTUAL. Hence selected CT Parameters satisfy the requirements.

(To be Contd…..)

Congratulations

Smt. Deepthi. V. S
W/o Er. Jayesh Lal . S. R,
has been awarded **Ph. D in Malayalam Literature**
from M.G University.
KSEBEA Idukki Unit gladly congratulates
on her meritorious achievement.

Smart Grid

Er.Sajith T.K.

Electricity is the most versatile and widely used form of energy and global demand is growing continuously. Most of the world existing electricity power systems that have been served us for a long time will soon reach their limitations. Most of today's generation capacity relies on fossil fuels and contributes significantly to the increase of carbon dioxide in the world's atmosphere, with negative consequences for the climate and society in general. The majority of those traditional electricity power grids are neither designed in purpose to comply with rapidly climate changes and the demand for a high energy-efficiency nor use the latest technologies.

The electrical power system was built up over more than 100 years. It is now one of the most effective components of the infrastructure on which modern society depends. It delivers electrical energy to industry, commercial and residential consumers, meeting ever-growing demand.

To satisfy both the increasing demand and to mitigate the consequences of climate change, the current electrical system needs to undergo significant adjustments; we need an electric system that can handle these challenges in a sustainable, reliable and economic way. That is why smart grid is not needed but will soon be put into practice.

A Smart Grid offers significant opportunities for utilities and consumers to wisely manage the energy consumption by the usage of advanced metering infrastructure and dual-way and real time communication. It also provides opportunities to wisely manage the fuel resources by potentially reducing the national need for additional generation sources, better integrating renewable and non-renewable generation sources into the grid operations, reducing outages and cascading problems, and enabling consumers to better manage their energy consumption. A Smart Grid is an electric network that can intelligently integrate the actions of all users connected to it for achieving the worldwide goals in the areas of energy security, climate change, grid reliability, economic growth, and national competitiveness.

A Smart Grid employs innovative products and services together with intelligent monitoring, control, communication, and self-healing technologies to:

- Facilitate the connection and operation of generators of all sizes and different technologies in power generation;
- Allow consumers to play a part in optimizing the operation of the system;
- Provide consumers with greater information and choice of supply with effective and economical consumption of power;

- Significantly reduce the environmental impact of the whole electricity supply system by in - cooperating renewable energy sources;
- Deliver enhanced levels of reliability and security of supply.

Historical development of the electricity grid.

Prior to electricity, various systems have been used for transmission of power across large distances. Chief among them were telodynamic, cable in motion used for transmission of electricity, pneumatic (pressurized air), and hydraulic (pressurized fluid) transmission in which the fuel is transmitted .Cable cars were the most frequent example of telodynamic transmission, whose lines could extend for several miles for a single section. Cities in the 19th century also used hydraulic transmission using high pressure water mains to deliver power to factory motors. London's system delivered 7000 hp about 5MW using 290 km network of pipes carrying water at 800 psi. These systems were replaced by cheaper and more versatile electrical systems, but by the end of the 19th century, city planners and financiers well aware of the benefits, economics, and process of establishing power transmission systems.

In early days for lightening purposes, gaslights were used and by the late 1870's the commercial use of electricity started. Early electricity was direct current, which could not easily be increased or decreased in voltage either for long-distance transmission or for sharing a common line to be used with multiple types of electric devices which uses different voltage levels. In 1882 first Electric Power System developed by Thomas Edison at Pearl Street Station. It is a 110V DC for incandescent lamps using under ground cables incorporating 59 customers with in 1.5KM radius.

The first alternating current power grid system was installed in 1886. In 1889 USA started first ac transmission system between Willamette and Portland. It is a single phase 4000V system over 21KM in length. First 3 phase line started in 1893 around 12KM in California.It was a centralized unidirectional system of electric power transmission and distribution; it was a demand-driven control system.

In the 20th century for economic and reliability reasons local grids were eventually interconnected and grew up day by day. By the 1960s, the electric grids of developed countries had become very large, mature and highly interconnected, with thousands of 'central' generation power stations delivering power to major load centers via high capacity power lines which were then branched and divided to provide power to smaller industrial and domestic users over the entire supply area. The topology of the 1960s grid was a result of the strong economies of scale: large coal-, gas- and oil-fired power stations in the 1 GW (1000 MW) to 3 GW scale are still found to be cost-effective, due to efficiency-boosting features that

can be cost effective only when the stations become very large.

Power stations were located strategically to be close to fossil fuel reserves (either the mines or wells themselves, or else close to rail, road or port supply lines). Sitting of hydro-electric dams in mountain areas also strongly influenced the structure of the emerging grid. Nuclear power plants were sited for availability of cooling water. Finally, fossil fuel-fired power stations were initially very polluting and were sited as far as economically possible from population centres once electricity distribution networks permitted it. By the late 1960s, the electricity grid reached the overwhelming majority of the population of developed countries, with only outlying regional areas remaining 'off-grid'.

Metering of electricity consumption was necessary on a per-user basis in order to allow appropriate billing according to the (highly variable) level of consumption of different users. Because of limited data collection and processing capability during the period of growth of the grid, fixed-tariff arrangements were commonly put in place, as well as dual-tariff arrangements where night-time power was charged at a lower rate than daytime power. The motivation for dual-tariff arrangements was the lower night-time demand. Dual tariffs made possible the use of low-cost night-time electrical power in applications such as the maintaining of 'heat banks' which served to 'smooth out' the daily demand, and reduce the number of turbines that needed to be turned off overnight, thereby improving the utilisation and profitability of the generation and transmission facilities. The metering capabilities of the 1960s grid meant technological limitations on the degree to which price signals could be propagated through the system.

Through the 1970s to the 1990s, growing demand led to increasing numbers of power stations. In some areas, supply of electricity, especially at peak times, could not keep up with this demand, resulting in poor power quality including blackouts, power cuts, and brownouts. Increasingly, electricity was depended on for industry, heating, communication, lighting, and entertainment, and consumers demanded ever higher levels of reliability.

Towards the end of the 20th century, electricity demand patterns were established: domestic heating and air-conditioning led to daily peaks in demand that were met by an array of 'peaking power generators' that would only be turned on for short periods each day. The relatively low utilization of these peaking generators (commonly, gas turbines were used due to their relatively lower capital cost and faster start-up times), together with the necessary redundancy in the electricity grid, resulted in high costs to the electricity companies, which were passed on in the form of increased tariffs. In the 21st century, some developing countries like China, India and Brazil were seen as pioneers of smart grid deployment.

(to be continued..)

ARE YOU SAFE?

Er. Asha Sunil

SAFETY FIRST is SAFETY ALWAYS and this is the logo we often preach. In our organization, though we do take some measures to practice electrical safety… is it done the right way? As Engineers of this reputed organization dealing with the most dangerous product, electricity, the million dollar question is , do we really practice what we preach.

It is not only the product electricity we deal with but also the networks and infrastructure to generate, to transmit and to distribute electricity. We have to ask ourselves, do we really give due concern for the safety of personnel who are employed in the infrastructure works.

Recently on visiting one of the construction sites of KSEBL in a hilly terrain I was overwhelmed to notice that no proper access was given to the work site for inspecting the works proceeding. The access to the site was arranged using primitive measures of a rope support and slippery boulders as stepping stones. Being brave is indeed great but don't we have to think that while working at heights or in slope terrains, acting brave near the edge, may lead your next step to a grave. The astonishing fact was that the work was supervised by eminent engineers who were responsible safety officers.

As engineers we should hold ourselves accountable for safety and always keep in mind that no job is so important and no service is so urgent that we cannot take time to perform our work safely. Safety doesn't happen by accident but we have to make it happen believing in keeping yourself safe. Remember, chance takers are accident makers. So never try to be a chance taker, always try to prepare and prevent injury and not repair and repent injury.

We can build good safety culture over time. Even if you have followed an unsafe culture so far, today you can set a ripple that starts to practice a safe deed. Be the beacon of change for the good safety culture and the ripple you have created will form a wave which cannot be opposed.

A simple awareness tool is to practice reciting safety slogan and displaying it at industrial and work sites. Make sure you never promote an unsafe deed. Safety is the seam that joins the fabric of life. Don't let a loose thread bring it all undone.

Let us start giving full justice to the slogan

SAFETY FIRST is SAFETY ALWAYS

Salaam –e- Apps

Er.Amalchith V.A.

Krishi App: Farming Guide
Category: Health&Fitness Size:3.0MB
Developers: Philosan Technologies

Krishi App, designed to inspire everyone to take up agriculture helps to cultivatenon-toxicvegetables and fruits by providing agricultural knowledge and solutions to control pests.

Main motto of this app is to make people self-dependent in agriculture and facilitatea culture of 100% Organic Farming, thereby building a healthy generation. This app promotes only organic farming so that we can have pesticide free food on our table. It also includes methods to make organic manures&natural pesticides.

With Offline feature, once viewed items are available without net connection. Presently, the number of items are limited and is expected to include more categories and crops.

Sensors: System Tool
Category: Tools, Size: 365 kB
Developers: CalinTataru

As the name suggests this app gives all information about various sensors used by our smart phone. It displays the output of each sensors available in simple, clean and readable form with extra information such as range and resolution. Values can be recorded to monitor changes over time and has no ads or in-app purchases.

SENSORS currently available are (depends on device): Accelerometer, Geomagnetic Field, Gravity, Gyroscope, Humidity, Light, Linear Accelerometer, Pressure, Proximity, Rotation Vector and Temperature.

Code of Ethics

Thou shalt maintain thy integrity under all circumstances.

Thou shalt incessantly work for the advancement of the professional knowledge.

Thou shalt not give an incorrect professional opinion

Remember Thou art a member of a team and the achievement of the team is thy own success

Thou shalt not malign thy co-proffessionalists.

Thou shalt strive for the advancement and dignity of thy juniors in the profession.

Thou shalt strive for the welfare of the community.

Thou shalt enlighten the community with the correct aspect of Engineering/Technological activities

Thou shalt endeavour to develop a dignified status in the society.

Thou shalt strive by conduct and character to be a worthy citizen of the Motherland.

Engineers' Day Celebrations September 2015

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