



ELECTRICAL INSTALLATION ENGINEER

NEWS LETTER

TAMILNADU ELECTRICAL INSTALLATION ENGINEERS' ASSOCIATION 'A' GRADE (Regn. No. 211/1992)
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தமிழக மக்களின் நலனையே தன் வாழ்வாகக் கொண்டு,
வாழ்ந்து மறைந்த மாண்புமிகு முதல்வரின் பர்வால் வாரும்
தேசத்தோடு எங்கள் ஆழ்ந்த வருத்தத்தைப் பகர்ந்து கொள்கிறோம்.
அன்னாருடைய ஆன்மா சாந்தியடைய பிரார்த்திக்கிறோம்.

**TAMILNADU ELECTRICAL INSTALLATION
ENGINEERS ASSOCIATION 'A' GRADE**

EVENTS

L&T Training Programme

Best maintenance practices in LV Switchgears

2nd – 6th January 2017

Switchboard Electrical Design

9th – 11th January 2017

Introduction to Industrial Electrical Systems

16th – 18th January 2017

23rd – 25th January 2017

Industrial Electrician Training Programme

18th – 19th January 2017

Electrician Training Programme for Residential Buildings

20th January 2017

Venue: L&T Ltd., Switchgear Training Centre, Nilgiris

Contact Tel.: 0423-2517107 **Fax:** 0423-2517158

Email: stc_coonoor@lntebg.com



Events Profile: The International Tradeshow and Conference on Power Generation, Electricals and Industrial Electronics

Date: 9th – 11th MARCH 2017

Venue: BCEC MUMBAI

Website: <http://www.powerelec.co.in/>

ELECTRIC, POWER & RENEWABLE ENERGY MALAYSIA 2017

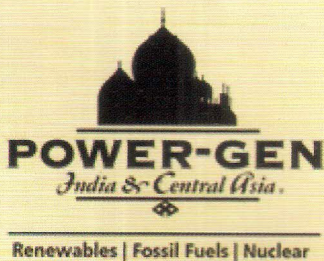
The Region's Flagship Event for Sustainable Power Generation, Energy Efficiency, Transmission and Renewable Technologies

Events Profile: EPRE 2017 is organised by Malaysia's leading exhibition organiser. All World Exhibitions members have been organising trade shows for over 30 years and currently organise over 150 trade exhibitions biennially. These include Asian Elenex (Hong Kong), Elenex Vietnam, Power Mongolia and Electric Power & Renewable Energy (Myanmar).

Date: 15th – 17th March 2017

Venue: Kuala Lumpur Convention Centre, Malaysia

Website: <http://www.epremalaysia.com/>



Events Profile: POWER-GEN India & Central Asia 2017 will bring together industry experts from across the globe to exchange knowledge and share their expertise, as well as showcase the latest power generation technology developments that will ultimately shape and strengthen the Indian power sector

Date: 17 – 19, May 2017

Venue: Pragathi Maidan, NewDelhi

Website: <http://www.power-genindia.com/index.html>

EDITORIAL

Dear Members, Fellow Professionals and Friends

"All other battles she won, but perhaps everybody has to lose one battle and she has lost that," President **Pranab Mukherjee's** *tribute to Former Tamilnadu Chief Minister Jayalalitha.*

Indeed we have lost a legendary leader who was virtually adopted as mother by masses.

Our Association joins the entire nation paying homage to our beloved departed leader.

The Indian Government took a bold step of Demonetization of higher value currencies during November and the large scale confusions and complaints and uproarious scenes in Parliament was on when this Editorial was being penned. The size of our country and the size of the problem and the speeds demanded for quick solutions could not be coped with which probably extended the problem duration. We sincerely hope that by the time this issue is in your hands, the situation would have reached a situation of normal and smooth and stable running of businesses and activities. As foreseen in a positive way by the Government, we also trust that the move and the hardships borne by common public would have also produced some positive signals of betterment of the economy.

December is a month of concerns for both **"Energy"** and **"Agriculture"** which are both interrelated and interconnected in Indian Economy. We celebrate **Energy Conservation Day** on the **14th** and the **"Kissan Diwas"** or farmers day on the **23rd of December**. We are a blessed country with assured Sun Light for most of the part of the year which in turn ensures waters and rivers and vegetation and agriculture and provides perennial sources for renewable energy. There have been enormous growth over the years in both Energy and Agriculture since Independence and by and large we are self sufficient and growing with potentials for large scale improvements and 'betterments'. Apart from the fact that we are recognized as one of the fast growing economies of the world, it will be apt to know and analyze at this point of time that India is one of the few countries of the world spending a high percentage of Energy for agriculture and employing a large percentage of population directly in agriculture. There is a large spend of Energy in **'Lift Irrigation'** Pumping Sets as the country presently has over 20 million pumping sets in use to make water available for irrigation due to scarce or non availability of river or canal or surface waters in most of the parts of the country. This situation prevails at present in spite of the fact that almost all rivers of the country put out large quantities of waters into the sea either normally or during times of flood. Equitable Distribution of all available waters in the country for all areas can reduce or eliminate Lift Irrigation needs, releasing lot of energy for other uses. Schemes have been drawn and examined without any progress of implementation and due to the importance and seriousness of water problems in many States, the Apex Court of India is now monitoring the steps and the progress and still there is no sight of any speedy or sustainable solution to the problem as the States are all possessive of the rivers in their respective States and do not easily agree for **'Interlinking of Rivers'** or sharing of waters. A novel alternative solution in the Name of National Waterways Development Project was developed to make use of part of the surplus waters and make it available for all areas in the country both for Agriculture and Drinking Water for all the people of the country. This was also under active consideration during the time when Dr. Abdul Kalam was the President of India and it really seems unfortunate that it has not progressed till date, considering the enormous advantages it can provide including additional generation of about 60,000 MW of Hydel Power.

We thank all those members who have helped us by participating in the advertisement appearing for the issue November 2016 – Galaxy Earthing Electrodes (P) Ltd., Anchor Electricals Pvt. Ltd., Elecexpo-5th Edition, Power Links, Universal Earthing Systems Pvt. Ltd., Dehn India Pvt. Ltd., Ringlet, Ashlok Safe Earthing Electrode Ltd., Flir India Pv. Ltd., Supreme Power Equipment Pvt. Ltd., OBO Bettermann India Pvt. Ltd., SPS Transformers P. Ltd., Wilson Power and Distribution Technologies Pvt. Ltd., Safvolt Switchgears Pvt Ltd., Kelcon, Consul Neowatt Power Solutions Pvt. Ltd., Elmetlerr, Electrotherm (India) Ltd.

EDITOR

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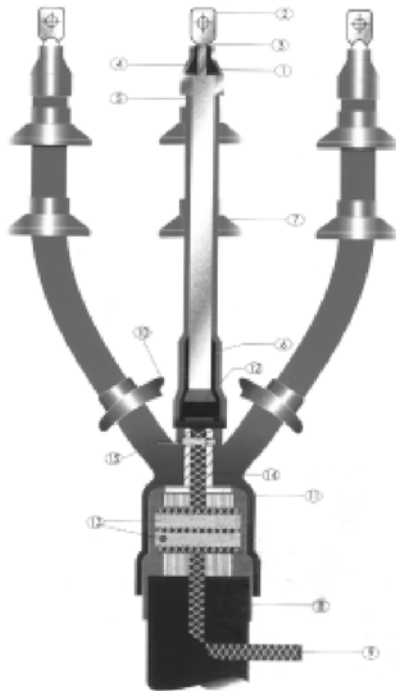
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166.	Airtex Electrical Services	Coimbatore	98424 81136, 90954 93370	EA 2005
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168.	B.K. Control Systems	Coimbatore	0422-2533176, 98946 12055	EA 2209
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176.	Devishree Electricals	Coimbatore	0422-2497843, 99401 87897	ESA 117
177.	Electrical Installation Systems	Coimbatore	94422 27237, 81229 77569	EA 2046
178.	Energy Control Corporation	Coimbatore	98432 36625, 98430 36626	ESA 333
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POWER LINKS

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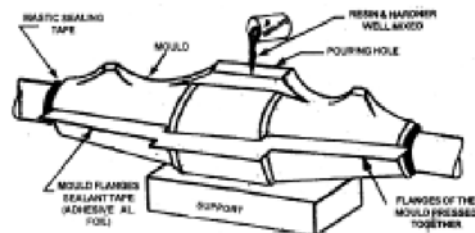
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The topic on storage battery continues.

I Test Data Trending and Benchmarks Setting

Among the frequently asked questions on batteries are,

- i. Battery is a mere “Energy Storage Device” which will be discarded after its designed service life. Then where does the need arise to test it periodically?
- ii. When we agree for periodical testing, what are the parameters that will be helpful to verify its health status?

To address these questions there is a need to understand the significance of “**Testing**”. If we want to get maximum output from any equipment, it should be kept in “good condition”, which demands its good up keep, meticulous maintenance and a close monitoring of its health status. Undertaking these measures correctly will aid timely corrective action, when any situation warrants it.

The methods like “Behaviour Trending of the Equipment” and its “Test Data Analysis” convey vital information about its health condition. Storage Batteries cannot be an exception to it. So “**Test Data Trending**” is the first step required to determine the health status of the batteries. This step will help identify whether the problems developed are imminent or a little further out. Though it seems that the storage battery is more a source of DC, its role is more than that. It is a much more complex equipment than we think; so a decision to replace the battery will be facilitated by the close monitoring of its degradation.

With trending, the emergency replacements of batteries decrease appreciably; a base line information can also be created. In the absence of such bench marks, it is preferable to make a comparison of each cell against every other cell in the string. Weak or suspect cells that requires further examination “**stand**” out.

Battery parameters that need attention

The battery parameters that need to be looked into are as follows

1. Impedance
2. Battery Resistance
3. Insulation Resistance
4. String Voltage
5. Voltage at each cell
6. Charger output current and Voltage
7. Corrosion at terminals
8. Ambient Temperature
9. Voltage and temperature of the cells that are selected as representative or pilot cells
10. Float Current
11. Unintentional Battery Grounds
12. Specific Gravity and Temperature of each cells
13. Intercell connection resistance
14. Structural integrity of the battery container and rack
15. Battery internal resistance
16. Temperature of the negative terminal
17. Voltage at each cell / unit
18. AC ripple current and voltage

Discharge testing and impedance testing are among the important screening tests.

The evaluation of testing costs also needs a look at in this context. The cost risk of battery maintenance is a factor to be considered for establishing the significance of the station batteries in power stations and important / vital grid coupling and secondary 110 KV substations. No doubt, not testing the batteries is a cost saving option; then we need to incur only maintenance costs. But the risks involved in this step are great and if any mishap or major problem happens, the overall costs will be extremely high. These costs draw a greater attention while evaluating the cost risk analysis. It is because the costs of the risks associated with the equipment being

is always high. So a balance needs to be arrived at between the battery testing and maintenance costs and the risks of losing the battery and the supported equipment. To quote an example, in a transmission substation, the normal power flow will worth crores of rupees / hour and the cost of maintaining its station battery is in the order of a few thousand rupees, a very small amount.

If the transmission flows are interrupted due to the failure of the battery, the consequential monetary losses or revenue loss will be very high. Added to this are the unwanted discomforts and inconvenience caused to the related consumers. So cost risk analysis of any station battery will always favour the meticulous up keep / maintenance of the station batteries and its routine testing.

In a capsule form, three main reasons are adduced in support of the need to test battery systems.

- To insure that the battery – supported critical equipment / system is safe and adequately by backed up; to ensure that its revenue streams are safe.
- To avert unexpected failures and
- To forewarn the premature failure of battery cells.

Further batteries associate with complex chemical processes; it has several components like grids, active material, posts, jar and cover – any of them can fail. In addition lies is the secrecy that envelopes / covers its manufacturing process i.e how will these components are made and tested is never revealed.

III Failure modes of lead acid batteries

1. Positive grid corrosion
2. Sediment building up
3. Top lead corrosion
4. Plate sulphation
5. Hard shorts (Paste Lumps)

Among these modes, the sediment building up is due to excessive discharge duty or excessive cycling. Other failure modes occur naturally (e.g) positive grid growth (oxidation) under normal operation of the battery. The occurrence of the premature battery failure depends upon the operating environment and the efficacy of maintenance undertaken. **Positive grid corrosion** is one of the failure modes of lead acid batteries. The battery grids are generally made up of lead alloys (lead calcium, lead antimony, lead antimony selenium) that convert into lead oxide overtime. As the lead oxide is a bigger crystal than the metal alloy, the plate grows. Nearing the end of life, the plates will grow, sufficiently to touch the tops off of the batteries. The growth will be normal when the battery is operated and maintained in accordance with the manufacturer's guidelines. When the undesirable processes like excessive cycling, temperature and over charging take place, the pace of formation of positive corrosion increases and hence its failure mode. As a complimentary measure, the impedance will increase over the time, with the resultant increase in the resistance of the grids that carry the current. Impedance also increases when the battery capacity decreases. **Sediment** build up (shedding) is a function of the amount of cycling a battery endures. Shedding is the sloughing off active material from the plates, converting to white lead sulphate. To meet the requirement of sediment up certain amount of space is normally left at the bottom of the battery containers. If the sediment build up is high or occurs at a faster rate, the battery plates will be shorted and the battery will become useless. The float voltage will drop then; the nature of fault normally decides this voltage drop. **Corrosion** of the top lead is another contributing factor for the failure since it forms the connection between the plates and the posts and occurs near the top of the battery, it is hidden by the cover. It renders it difficult to find this fault. This kind of failure leads to high current drawal during the switch off of AC mains; the heat formed then will melt the crack open and cause the entire string drops off-line leading to catastrophic failure. **Sulphation** is yet another contributing factor for battery failure. It is the process of converting active plate material to inactive white lead sulphate. It is easily found in impedance tests. Sulphation also occurs when the charger voltage settings are kept at a low level or the occurrence of in complete recharge after an outage. **Dry out** is another phenomenon that occurs, when excessive heat remains in this battery containers either due to lack of ventilation or due to over charging with the attendant elevated internal temperature and high ambient (room) temperature. Now it is time for me to sign off.

(To be continued...)



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STERLITE GRID BECOMES INDIA'S FIRST TO DEPLOY AIRCRANE FOR POWER TRANSMISSION PROJECT; PARTNERS US' ERICKSON FOR AERIAL EXPERTISE

Sterlite Power Grid Ventures Limited (Sterlite Grid) has become India's first private power transmission developer to deploy Aircrane for setting up of a power transmission line in the extremely challenging terrain of Jammu & Kashmir. Sterlite Grid has partnered with US-based Erickson Inc. to install nearly 160 transmission towers in the rough terrain of PirPanjal ranges, using Erickson's S64 Aircrane, a heavy lift helicopter.

With the NRSS 29 Project set to commence in mid 2016, Sterlite Grid expects to commission the transmission network between Punjab and Jammu & Kashmir nearly 10 months ahead of schedule.

Erickson will help Sterlite Grid erect towers for the NRSS 29 power line in the remote Himalayan region at altitudes of 9,000-12,500 feet. Erickson will fly materials and steel to build the towers utilising the S64 Aircrane, capable of high-precision aerial lift work. Erickson has 40 years of experience in building transmission towers utilising the Aircrane in similarly remote and austere environments.

With J&K's power demand at about 3,000 MW, the Project will enable the state to draw double the power from the national grid. Today, the state is dependent on local hydro power projects and a single transmission line passes through avalanche/ landslide prone areas connecting J&K with the national grid. The NRSS 29 project will strengthen the existing power transfer capability by 70%, provide an alternate route for power transfer and increase reliability of the grid. It will enable exchange of more than 1,000 MW of power between J&K & Northern Grid and create provision for future expansion. The NRSS-29 is the largest private sector transmission project awarded in India till date.

"We, at Sterlite Grid, are committed to the nation's vision to electrify every home. We strongly believe innovation and cutting-edge technologies will be the key drivers to achieve faster growth. We are glad to introduce a global leader like Erickson to the potential of India's infrastructure sector and look forward to working with them on future projects," said Pratik Agarwal, Vice Chairman, Sterlite Grid.

"Erickson is excited to have been awarded this strategic contract in India by Sterlite Grid. India is a large market for Erickson and we believe we can offer a competitive advantage in the construction of infrastructure projects in the country. As a business, we are pivoting towards long-term, infrastructure projects in the emerging and developing markets. We are looking forward to building a long-term relationship with Sterlite Grid and India," said Jeff Roberts, President and CEO, Erickson.

Sterlite Grid, India's largest private developer of independent power transmission systems, is building ~450 Circuit Kilometre of transmission lines and 400/220-kilovolt (kV) gas insulated substation (GIS) in Amargarh, J&K (Northern Region Strengthening Scheme-29 Project). To complete this line, nearly 1,150 towers will be erected in the most challenging terrains of Pir Panjal range which lies in the inner Himalayan region.

Sterlite Grid is known for introducing robust technologies in power infrastructure development. It is the first Indian company to use LiDAR based surveys to optimise transmission lines and heli-stringing for least disturbance



to neighbours and early commissioning. Recently Sterlite Grid joined hands with Sharper Shape, Finland's leading drone solutions provider, to deliver cutting-edge drone-technologies for the power transmission industry.

About Sterlite Grid

Sterlite Power Grid Ventures Limited is a subsidiary of Pune-headquartered Sterlite Technologies Limited (BSE: 532374, NSE: STRTECH). In a short span, Delhi-based Sterlite Grid has built a strong portfolio of eight projects spanning nearly 6,000 Circuit Km, entailing an investment of ~Rs 10,000 crore. It owns and operates ~3,200 Circuit Km, under four of the operating projects, across eight states in India. It is also the first Indian developer to deploy aerial technologies such as LiDAR survey and helicopter-aided construction in India, reducing the commissioning time. For more information, visit www.sterlitegrid.com.

About Erickson

Erickson is a leading global provider of aviation services and operates, maintains and manufactures utility aircraft to safely transport and place people and cargo around the world. The Company is self-reliant, multi-faceted and operates in remote locations under challenging conditions, specialising in Global Defence and Security, Manufacturing and MRO, and Commercial Services (comprised of fire fighting, HVAC, power line, construction, timber harvesting, oil & gas and speciality lift). With roots dating back to 1960, Erickson operates a fleet of approximately 80 aircraft, is headquartered in Portland, Oregon, USA, and operates in North America, South America, Europe, the Middle East, Africa, Asia Pacific, and Australia. For more information, please visit our website at www.ericksoninc.com.

UNNATJYOTI BY AFFORDABLE LEDS FOR ALL

Karnataka has crossed the coveted one crore mark in the distribution of LED bulbs under the **UJALA** (Unnat Jyoti by Affordable LEDs for All) **scheme**, popularly known as 'HosaBelaku' scheme, resulting in saving of Rs 1.75 crore per day of energy charges. The scheme has led to daily energy saving of over 43.94 lakh kWh, which is capable of lighting over three lakh homes for a year. Apart from this, the state has also benefited from daily CO₂ emission reduction of 3,560 tonnes.

Of the total sale of 1.23 crore LED bulbs, Bengaluru stands first in the state, with 40 lakh being sold there. This is followed by Mysuru with 13.74 lakh and Mangaluru with 13.39 lakh. Even Udupi, which joined the scheme late, has seen 2.55 lakh LED bulbs being sold to consumers. In Uttara Kannada, the distribution of LED bulbs is 66,437.

The national figure for LED distribution stands at 15.52 crore, which has resulted in energy saving of over 5.5 crore kWh per day. The cost saving per day is Rs 22.09 crore and has avoided a peak demand of 4,036 MW. The CO₂ reduction per day is 44,737 tons.

While a consumer having 3kw and above load will get 10 LED bulbs, customers with less than that load will get five. Karnataka was the fastest state to distribute 50 lakh LED bulbs under the UJALA, according to Energy Efficiency Services Limited (EESL), a public energy service company under the union ministry of power.

Mescom officials point out there were six lakh households in the district and about 30 lakh to 35 lakh bulbs needed to be replaced with LEDs. When all households adopt LEDs, it will give Mescom huge energy saving to the tune of 65% over incandescent light bulbs.

The sales of LED : 40,663 - Bagalkot; 9,32,600 - Belgavi; 3,80,646 - Ballari; 2,12,772 Bengaluru - Rural; 39,90,641 - Bengaluru Urban; 46,080 - Bidar; 8,608 - Vijayapura; 1,63,803 - Chamrajanagara; 3,22,508 - Chikkamagaluru; 2,72,140 - Chikkaballapura; 31,047 - Chitradurga; 13,39,179 - Dakshina Kannada; 2,00,701 - Davanagere; 1,16,999 - Dharwad; 12,595 - Gadag; 1,78,531 - Kalaburagi; 5,29,475 - Hassan; 33,404 - Haveri; 2,10,118 - Kodagu; 2,06,134 - Kolar; 65,472 - Koppal; 3,12,398 - Mandya; 13,74,742 - Mysuru; 49,138 - Raichur; 3,48,423 - Ramanagara; 3,99,851 - Shivamogga; 2,45,424 - Tumakuru; 2,55,680 - Udupi; 66,437 - Uttara Kannada and 6,014 - Yadagiri.



Courtesy: Karnataka Everyday

FIRST FLOATING SOLAR POWER UNIT IN NAGPUR GETS GOOD RESULTS

In a first of its kind in Central India, a prototype of solar power plant installed on a floating platform at Vidarbha Industries Power Ltd (VIPL), a Reliance Power group company at Butibori, is being seen as a major advance with multiple advantages over rooftop solar generation models.



The solar panels set up on a floating platform over the raw water reservoir have not only checked evaporation in the water body but the biggest surprise has come in the form of around 30% additional power generation as compared to a similar size solar unit put up on a rooftop in the same complex. VIPL is a 600MW thermal power project.

“Water evaporation in extreme summers here caused a big loss to the company. In order to reduce the same and also to get clean power, we went for the new concept of solar power on floating platform. Presently the capacity under trial is just 5kw. But what could be a path-breaking result is the extra efficiency of the floating solar panels,” said AsheshPadhy, station director of VIPL.

“The humidity in the water body provides a cooling effect to the solar panels increasing their power generation. We have installed a rooftop solar plant too, but the floating one is giving almost 30% more power,” said Padhy. The floating plant is designed and installed specially by BAalgo Solar, a Nagpur-based company. The platform has been made safe with earthing to prevent electrocution and arrangement has been made to adjust to fluctuating water levels of the reservoir, according to SudhirBudhay of BAalgo. This is his first successful trial of a floating unit.

“The combined reservoir area at VIPL can host 4 to 4.5MW of solar power generation plant. We are happy with the trial unit and may go in for more floating units after studying how this unit withstands different weather conditions,” said Padhy.

Budhay is confident that the floating solar plants will catch up fast as enquiries from all over Central India are pouring in. “As far as I know only couple of such plants are in operation in the country, one of them in West Bengal at an educational institution. But the advantages it has shown is attracting many people.

Solar power as a green energy source has seen a major spurt in last two years after the Modi government’s big push to non-conventional energy as a policy. “VIPL is so keyed in to solar as clean energy source that it has also planned a parking lot with solar panels to be followed up with a solar road,” said KrantiGiri, a young engineer maintaining the solar units.

Courtesy: The Times of India

DRAFT

Dear readers, we as citizens & customers, for a change always want to generate power and to sell excess power generated to utility companies. Slowly Netmetering is gaining popularity. Telangana is one among few to issue a draft policy in netmetering. In the interest of the subject, Draft policy by Telangana Govt, for you.

Editor

THE TELANGANA STATE ELECTRICITY REGULATORY COMMISSION

Regulations for connectivity with the Grid and sale of Electricity from the Roof-top Solar Photovoltaic Regulation No. of 2016

The Commission is vested with the powers under the Electricity Act, 2003 (Act No.36 of 2003) to promote the generation of electricity from the Renewable sources of energy in the state of Telangana. In exercise of powers conferred under Sections 61, 66, 86(1)(e) and 181 of the Electricity Act, 2003 and all other powers enabling it in this behalf, the Commission hereby makes the following Regulation for the grid connected Solar Rooftop Photovoltaic System:

1. Short title, and commencement

1.1 This regulation shall be called the Telangana State Electricity Regulatory Commission (Net Metering Rooftop Solar PV Grid Interactive Systems) Regulation, 2016.

1.2 This regulation shall come into force from the date of its notification in the Official Gazette and extends to the entire state of Telangana.

2 Definitions and Interpretations

2.1. In this regulation, unless the context otherwise requires,

- (1). “**Act**” means the Electricity Act, 2003 (Act No.36 of 2003) as amended from time to time ;
- (2). “**Agreement**” means a connection agreement entered into between the Distribution Licensee and the consumer;
- (3) “**Area of Distribution**” or “**Area of Supply**” means the area stated in the Distribution Licence within which a Distribution Licensee is authorized to operate and maintain a Distribution System for supplying electricity to the consumers in its/his area of supply;

Provided that area of supply in respect of a deemed licensee shall be the whole area of supply within which the deemed licensee is authorised to supply electricity in the Special Economic Zones (SEZ) notifications issued by the Ministry of Commerce & Industry, Government of India under sub-Section (1) of Section (4) of the Special Economic Zones, Act, 2005.

- (4). “**Average Power Purchase Cost**” (APPC) means the Weighted Average Pooled Price at which the distribution licensee has purchased the electricity including the cost of self-generation, if any, in the previous Financial Year from all the energy suppliers on long-term, medium-term and short-term basis, but excluding the energy purchased from the renewable energy sources;
- (5). “**Billing Cycle or Billing Period**” means the period for which the regular electricity bills are prepared for different categories of consumers by the Distribution licensee as specified by the Commission;
- (6). “**Commission**” means the Telangana State Electricity Regulatory Commission constituted under the Act;
- (7). “**Consumer**” means a consumer as defined in sub-section (15) of Section 2 of the Act;
- (8). “**Connected load**” expressed in Kilowatt (kW), Kilo Volt Ampere (kVA) or Horse Power (HP), refers to aggregate of the consumer’s rated capacities of all the energy consuming devices or apparatus connected with the distribution licensee’s service line on the consumer’s premises as specified in the Agreement entered into between Distribution Licensee and a consumer.

Explanation:

- (1). In case of a consumer who availed of supply under Low Tension, the connected load and the contracted load are same.
- (2). In case of a consumer who availed of supply under High Tension, the connected load and the contracted load are different.
- (3). For the purpose of levy of any charges and for deciding the supply voltage, the contracted load shall be determined as per the method prescribed by the Telangana State Electricity Regulatory Commission in the Regulation from time to time;
- (9). “**Contracted load**” or “**Sanctioned load**” or “**Contracted demand**” means the maximum demand in Kilowatt (kW), Kilo Volt Ampere (kVA) or Horse Power (HP), agreed to be supplied by the Distribution licensee or a Deemed Licensee and specified in the agreement executed between such licensee and the consumer;
- (10). “**Distribution Licensee**” means a person authorised by a Distribution Licence to operate and maintain a distribution system for supply or conveyance or wheeling of electricity to the consumers in his / its area of supply and shall include a Deemed Licensee;
- (11). “**Electricity Supply Code**” means the Telangana State Electricity Regulatory Commission Regulation, (No.1 of 2014) adopting the erstwhile Andhra Pradesh Electricity Regulatory Commission’s Electricity Supply Code Regulation, 2004 (No. 5 of 2004) and its amendments under Section 50 of the Act;
- (12). “**Eligible Consumer**” means a consumer of electricity in the area of supply of the distribution licensee or the deemed licensee, who uses or proposes to use a Rooftop Solar PV System, which can be self-owned or a third party owned to offset a part or all of the consumer’s own electrical requirement including a consumer catering to a common load such as a Housing Society.
- (13). “**Financial Year**” or “**Year**” means the period beginning from the first (1st) of April and ending on thirty first (31) of March of the next year;
- (14). “**Interconnection Point**” means the interface of a Rooftop Solar PV System with the outgoing terminal of the meter/Distribution Licensee cut out/switch gear fixed in the premises of eligible consumer of a distribution licensee or a deemed licensee;
Provided that an Eligible Consumer connected at the High Tension (‘HT’) level, the ‘inter-connection point’ shall mean the interface of the Rooftop Solar PV System with the outgoing terminals of the Distribution Licensee’s metering cubicle placed before such Consumer’s apparatus.
- (15). “**Invoice**” means either a Regular Bill / Supplementary Bill or a Regular Invoice/ Supplementary Invoice raised by a distribution licensee;
- (16). “**Net Metering**” means an arrangement under which a Rooftop Solar PV System installed at an Eligible Consumer’s premises delivers surplus electricity, if any, to a Distribution Licensee after off-setting the quantum of electricity supplied by the distribution licensee to such Eligible Consumer during the applicable billing period.
- (17). “**Net meter**” means an appropriate energy meter which is capable of recording both import and export of electricity or a pair of energy meters one each for recording the import and export of electricity, as the case may be;
- (18). “**Net Metering Arrangement**” means an arrangement under which a Rooftop Solar PV System with Net Meter installed at an Eligible Consumer’s premises delivers surplus electricity, if any, to the Distribution Licensee after setting off the quantum of electricity supplied by such Licensee during the applicable Billing Period ;
- (19). “**Net Metering Connection Agreement**” means an agreement entered into by a Distribution Licensee and an Eligible Consumer for executing a Net Metering arrangement;
- (20). “**Obligated entity**” means an entity required to fulfill a Renewable Purchase Obligation (‘RPO’) as specified by the Commission in Regulation governing such Obligation (‘the RPO Regulations’);
- (21). “**Premises**” means and includes rooftops or elevated areas on the land, building or infrastructure or part or combination thereof in respect of which a separate meter or metering arrangements have been made by a licensee for supply of electricity;

(22). “**Rooftop Solar PV Power Plant**” or “**Rooftop Solar PV System**” means the Solar Photo Voltaic Power Plant including a small a solar system, installed on the rooftops or ground mounted or open land owned and operated on a consumer premises or operated by a third party owner on a consumer’s premises that uses the sunlight for direct conversion into electricity through the photovoltaic technology;

(23). “**Renewable Energy Certificate (REC)**” means the certificate issued in accordance with the procedures specified by the Central Electricity Regulatory Commission;

(24). “**Renewable Energy System**” means the system to generate the electricity from such source(s) which are recognized as renewable energy source(s) by the Ministry of New & Renewable Energy (MNRE) or any agency notified by Govt. of India or the Commission;

(25). “**State Nodal Agency**” means the Telangana New & Renewable Energy Development Corporation Limited (TNREDCL) or any other agency designated by the Commission for the purpose of this Regulation;

(26). “**Tariff Order**” in respect of a Distribution licensee means the most recent Retail Supply Tariff Order issued by the Commission for that licensee indicating the rates to be charged by the licensee to various categories of consumers for supply of electrical energy and services;

(27). “**Third party owner**” means a developer who is generating electricity from the Rooftop Solar PV System on a premises which is not owned by him, but who enters into a lease or commercial agreement with the owner of the premises.

2.2 Interpretations

a. The Words and expressions used and not defined in this Regulation but defined in the Act, shall have the meanings assigned to them in the Act. Expressions used herein but not specifically defined in this Regulation or in the Act but defined under any law passed by a competent legislature and applicable to the electricity industry in the state, shall have the meaning assigned to them in such law.

b. In the interpretation of this Regulation, unless the context otherwise requires:

i. words in the singular or plural term, as the case may be, shall also be deemed to include the plural or the singular term, respectively;

ii. references herein to the Regulation shall be construed as a reference to this Regulation as amended or modified by the Commission from time to time in accordance with the applicable laws in force;

c. the headings are inserted for convenience and may not be taken into account for the purpose of interpretation of this Regulation;

d. References to the statutes, regulations or guidelines shall be construed as including all statutory provisions consolidating, amending or replacing such statutes, regulations or guidelines, referred to.

3. Scope and Application

3.1 This Regulation shall apply to a distribution licensee, an eligible consumer and a third party owner of a Roof Top Solar PV System in the state of Telangana.

3.2 An Eligible Consumer may install a Rooftop Solar PV System under the net metering arrangement which:

a. shall be within the permissible rated capacity as specified in this Regulation;

b. shall be located in the consumer’s premises;

c. shall interconnect and operate safely in parallel with the distribution licensee network;

d. Priority for connectivity to the network distribution of the Licensee shall be accorded to an eligible consumer who has installed the Rooftop Solar PV system before the commencement of this Regulation, provided such consumer complies with the conditions of this Regulation.

3.3 This Regulation does not preclude the right of a Distribution licensee or the State Government Department/ authorities to undertake the Rooftop Solar PV projects above 1 MWp capacity through the alternative mechanisms.

4. General Principles

4.1. The distribution licensee shall permit the net metering arrangement to an eligible consumer who has installed or intends to install the grid connected Rooftop Solar PV System in its area of supply on a non-discriminatory and first come first serve basis.

4.2 The inter-connection of Roof-top Solar PV System with the Network of the Distribution Licensee shall be undertaken in accordance with the standards and norms specified in the Central Electricity Authority (CEA) (Technical Standard for Connectivity of the Distributed Generation Resources) Regulations, 2013 and any amendments thereto from time to time.

4.3 An eligible consumer shall install the grid connected Rooftop Solar PV System of the rated capacity as specified in this Regulation;

4.4 The tariff payable to an eligible consumer under the net-metering shall be the average power purchase cost of a Distribution Licensee.

4.5 The net metering facility, as far as possible, of an eligible consumer shall be in three phase service.

4.6 A single phase consumer is also eligible for net metering upto 3 KW.

4.7 The capacity of a Rooftop Solar PV System to be installed at the premises of an eligible consumer shall not be less than one Kilo Watt peak (1kWp) and a maximum of One (1) MWp [One Mega Watt peak].

4.8 No distribution losses shall be applicable to an eligible consumer.

4.9 Without prejudice to Sub-Paras 4.1 to 4.8, an eligible consumer has the option of choosing the gross metering at 11 kV and above at the average cost of service of the Distribution Licensee as determined by the Commission from time to time in its Retail Supply Tariff Order. The guidelines for gross metering shall be framed by the Distribution Licensee, which shall be subject to the approval of the Commission.

4.10 The facility of net metering or gross metering, as the case may be, shall be applicable to an eligible consumer of the Rooftop Solar PV System for a period of Twenty (20) years from the date of connection with the Grid of the Distribution Licensee.

4.11 An eligible consumer intending to install a Rooftop Solar PV System having the capacity in excess of 75 KW shall insure the PV system and obtain the certificate from the Chief Electrical Inspector to the Government (CEIG), who shall test and certify the safety and protection within Fifteen (15) working days from the date of receipt of the information.

4.12 An eligible consumer intending to install a Roof Top Solar PV system having capacity in excess of 75 KW and upto 1 MW can connect to 33 kV feeder of Distribution Licensees from which feeder the eligible consumer is availing of supply of power.

5. Capacity Limits of distribution Transformer Level and 11 kV Feeder

5.1 The distribution licensee shall allow the Net metering arrangement to an Eligible Consumer. Provided that the cumulative capacity of all Rooftop Solar PV Systems of LT eligible consumers under the Net Metering Arrangements connected to a particular Distribution Transformer of the Licensee shall not exceed 30% of its rated capacity;

Provided that the cumulative capacity of all Rooftop Solar PV Systems of 11 kV HT consumers under the Net Metering Arrangements connected to a particular 11 kV feeder of the Licensee / DISCOM shall not exceed 30% of its maximum load permitted on that particular 11 kV Feeder;

Provided further that the Distribution Licensee may allow the Net Metering connectivity exceeding 30% of such rated capacity upon consideration of a detailed load study carried out by it.

5.2 The Distribution Licensee shall provide information on its website regarding the capacity available on each Distribution Transformer and 11 kV feeder of a substation and 33 kV feeder for connecting the Rooftop Solar PV Systems under the Net Metering arrangements within three months from the notification of this Regulation. The Distribution Licensee shall thereafter update the Distribution Transformer-wise, 11 kV feeder-wise and 33 kV feeder-wise capacity available and the cumulative capacity of the Rooftop Solar PV Systems installed under the Net Metering arrangements quarterly, and provide the information on its website in the month following the close of the relevant quarter.

6. Eligible Consumer and individual project capacity

6.1. An Eligible Consumer for a Rooftop Solar PV System with the Net Metering shall:

- i. be a consumer of the local distribution licensee;
- ii. own or be in legal possession of the premises including the rooftop or terrace or elevated areas on land, building or infrastructure or part or combination thereof on which the Solar PV System is proposed to be installed;

- iii. connect the proposed Rooftop Solar PV System to the Distribution System of the Licensee;
- iv. consume all of the electricity generated from the Rooftop Solar PV System at the same premises. If the consumer is not able to consume the entire generated electricity in the same premises, then, he/it shall be governed by the energy accounting and settlement provisions of this Regulation.

6.2 The maximum Rooftop Solar PV System capacity to be installed at any Eligible Consumer’s premises shall be as under:

- i. For Residential and Government consumers: upto a maximum of 50% of the consumer’s sanctioned load;
- ii. For Industrial, Commercial and Other Consumers: up to a maximum of 50% of the sanctioned load/contracted demand of the consumer. Provided that the installed capacity shall not be less than 1 kWp and shall not exceed 1 MWp and the installed capacity is aligned with the provisions for permitting the consumer connections as stipulated in the Electricity Supply Code notified by the Commission.

6.3 High Tension (HT) (11 kV and 33 kV) eligible Consumers may install and connect the Rooftop Solar PV System at their LT Bus Bar System and the Net Meter shall be installed on the HT side of interconnecting point where present metering cubicle is existing.

6.4 An Eligible Consumer may install or enhance the capacity of or upgrade the Roof-top Solar PV Systems at different locations within the same premises:

Provided that the total capacity of such Systems within the same premises shall not exceed the individual capacity limits specified in this Regulation.

7 Procedure for Application, Registration and approval by the Distribution Licensee

7.1 An Eligible Consumer who proposes to install a Rooftop Solar PV System in his premises shall submit an application to the Distribution Licensee along with the necessary documents specified by the Distribution Licensee and the applicable fee which is as under.

System Size	Applicable fee per connection
From 1 kW up to 6 kW	Rs.1,500
More than 6 kW up to 100 kW	Rs.10,000
More than 100 kW up to 1 MW	Rs.50,000

7.2 The nodal point of contact for the Solar Net Metering programme shall be the local Divisional Engineer (Operations) of the Licensee who has the jurisdiction over the premises of the eligible consumer. The consumer can download the Solar Net Metering Rooftop Application from the official website of TSDISCOMs and submit the filled in Application to the concerned Divisional Engineer (Operations) of TSDISCOMs.

7.3 The Distribution licensee shall acknowledge the receipt of the application form and register the application and shall process the application in the chronological order of the receipt.

7.4 Within seven (7) working days of the receipt of the Eligible Consumer’s application, the distribution licensee shall provide a written notice that it has received all the documents required for the interconnection agreement or furnish the deficiencies in the application.

7.5 The Distribution Licensee shall assess the feasibility of interconnection and the relevant distribution transformer capacity and/or relevant 11 kV/33 kV feeder capacity (in case of HT consumer) and communicate the same to the Eligible Consumer within Twenty One (21) working days from the receipt of proper application. The feasibility communicated shall be valid for a period of four (4) months, unless extended by the Distribution Licensee for a reasonable cause. Any application not approved within Twenty One (21) working days from the date of receipt shall be deemed to have been approved.

Provided that the feasibility communicated by the Distribution Licensee shall not exceed a period of Ten (10) months including the extended time from the date of first feasibility communication.

7.6 While communicating the feasibility for the connection of Rooftop Solar PV System, the Distribution Licensee shall communicate the Eligible Consumer:

- (a) Particulars of deficiencies with reference to interconnection of the proposed Rooftop Solar PV System with the Distribution System of Licensee;

(b) Cost estimate for removal of such deficiencies including augmentation of the transformer/distribution system, if required.

7.7 The Eligible Consumer shall pay the estimated amount to the distribution licensee within Fifteen (15) days of receipt of such communication from the distribution licensee.

Provided that if the sum as per sub-para 7.6 is not paid by the Eligible Consumer within Ten (10) days from the date of receipt of such communication to the Eligible Consumer, the application shall stand cancelled and the application fee shall be forfeited. Provided further that where approval cannot be granted due to inadequate Distribution Transformer capacity or 11 kV/33 kV Feeder capacity (in case of HT consumer), the application may be considered, in chronological order of seniority and if the consumer so opts, after such capacity becomes available.

7.8 The Distribution Licensee, on receipt of the estimate amount, shall promptly remove the deficiencies in the distribution system including augmentation of the transformer/distribution network within Fifteen (15) days.

7.9 On removal of such deficiencies including augmentation of distribution transformer/distribution network, the distribution licensee shall immediately convey the approval for interconnection of the proposed Rooftop Solar PV System to the Eligible Consumer. A copy of such approval shall also be forwarded to the State Nodal Agency and the Chief Electrical Inspector by the distribution licensee for necessary action by them as per this Regulation.

7.10 The interconnection agreement as devised by the Distribution Licensee shall be executed by the Eligible Consumer with the distribution licensee within Fifteen (15) days of receipt of the approval.

(To be continued...)

HERITAGE FOODS COMMISSIONS SECOND WIND POWER PROJECT WITH SUZLON IN ANDHRA

Heritage foods Ltd, one of the largest private sector dairy enterprises in Southern India, said it has **finished the commissioning of the 2nd wind power plant at Vajrakarur of Ananthapur District in Andhra Pradesh.**

The wind power plant has a **2.1 MW capacity** and is expected to generate **5 million units per year**. At Rs 7 per unit, that is worth about Rs 3.5 cr per year.

The power generated will be consumed at dairy plants of the company under Captive Open Access Arrangement through Andhra Pradesh Southern Power Distribution Company Ltd..

The plant has been made with S90-97 hubs with a height of 90 meters, which is supposed to increase the generation efficiency. The company said the model uses the latest generation technology available in Indian wind power market.

The plant will reduce 4885 tons CO₂.

The commissioning has been possible due to the efforts of Suzlon Group Company.

“Suzlon helped us to achieve the plant commissioning within 60 Days and connect to APTRANSCO 33KV pooling sub station at Vajrakarur,” said the company.

The Plant will be maintained by Suzlon Group for initial period of 10 Years.

Read more at <https://rtn.asia/d-n/22935/heritage-foods-commissions-second-wind-power-project-suzlon-andhra#ib5ZlBCHrkvbFxp8.99>



GOVERNMENT LAUNCHES NATIONAL PROGRAMMES FOR SMART PUMPS FOR FARMERS AND ENERGY EFFICIENT FANS

Vijayawada to be the first city to implement the National Energy Efficient Fan Programme-EESL will distribute 2 lakh Smart SIM-enabled Agricultural Pumps sets free of cost to the farmers in AP



In order to make country more energy efficient, the Union Government today launched two schemes namely **National Energy Efficient Agriculture Pumps Programme** and **National Energy Efficient Fan Programme** in Vijayawada, Andhra Pradesh. The programme was launched by the Chief Minister of Andhra Pradesh, Shri N. Chandrababu Naidu during the inaugural session of the two-day International workshop on energy efficient lighting. These **Schemes will be implemented by Energy Efficiency Services Limited (EESL), a JV of PSUs under Ministry of Power.**

Under the **National Energy Efficient Agriculture Pumps Programme**, farmers can replace their inefficient pumps **free of cost** with the new BEE star rated energy efficient agricultural pump-sets. These pumps will come enabled with smart control panel and a SIM card, giving farmers the flexibility to remotely control these pumps from their mobile phones and from the comfort of their homes. EESL will distribute 200,000 BEE star rated pump-sets to the farmers under this programme, which will lead to 30% of energy savings by 2019. This translates into an annual savings of approximately Rs 20,000 crore on agricultural subsidies or a saving of 50 billion units of energy every year.

FEATURES OF NATIONAL ENERGY EFFICIENT AGRICULTURE PUMPS PROGRAMME

Smart BEE star rated Energy Efficient Agricultural Pump sets be distributed to farmers.

Farmers can replace their inefficient agricultural pump sets **free of cost.**

Pumps to come with Smart Control Panels that has a SIM card and a Smart Meter.

Smart Control Panel will enable a farmer to switch on or switch off these pumps through his mobile and sitting at the comfort of his home.

Smart meters to ensure the farmers to monitor consumption on real time basis.

"Aspire to decency. Practice civility toward one another. Admire and emulate ethical behavior wherever you find it. Apply a rigid standard of morality to your lives; and if, periodically, you fail - as you surely will - adjust your lives, not the standards." - TED KOPPEL

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CUT CARBON EMISSIONS BY A QUARTER MORE, URGES UNEP

Countries must act immediately to deepen emissions cuts if the world is to stand a chance at limiting global warming to 1.5 degrees Celsius this century, according to a new report from the United Nations Environment Programme (UNEP). Released the day before the Paris Agreement came into force, the report says global emissions must fall by a further 25% from the predicted 2030 level, or by 12-14 gigatonnes, if the world is to remain on course to meet its climate targets.

Since the early ratification of the Paris Agreement in

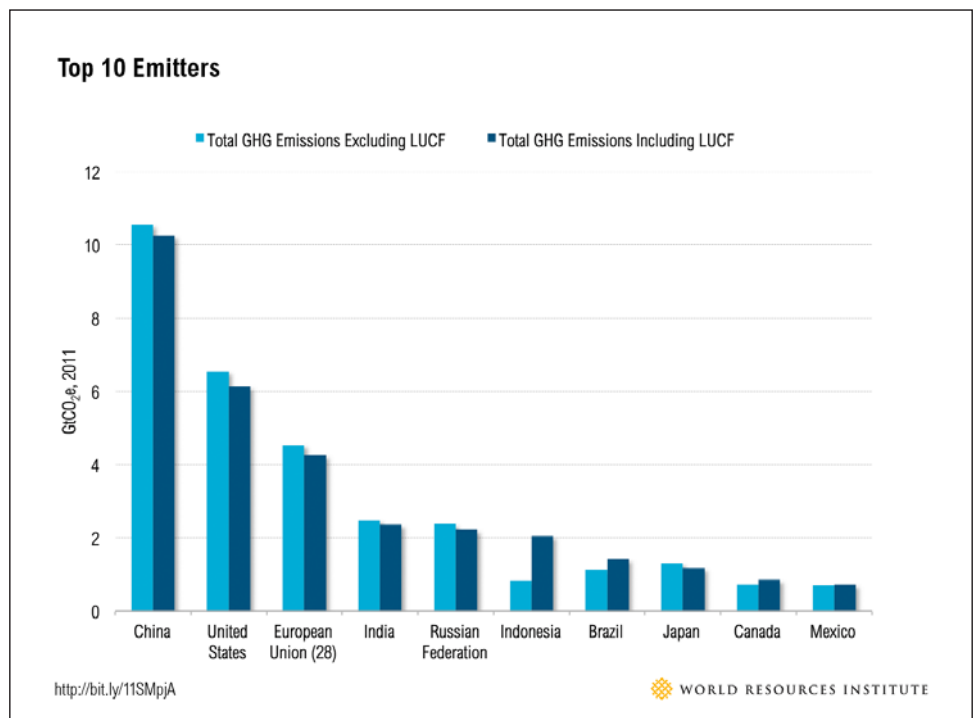
October, the pledges of countries to control greenhouse gas emissions have come under increasing public scrutiny, and will be a focus of the November 7-18 summit of the United Nations Framework Convention on Climate Change (UNFCCC) in Marrakech, Morocco. Things are moving in the right directions... [but] we have to peak these global emissions by 2020 if we are going to make the lower end of our trajectory," said Jacqueline McGlade, chief scientist for UNEP and co-author of the Emissions Gap Report 2016. This year, the annual UNEP study measured the gap between the emissions cuts needed to stabilise global warming and the pledges made in 2010 by over 160 countries to reduce emissions. These had been submitted by the governments via the Cancun Pledge (the economy-wide targets to reduce emissions presented to the UN in 2010), and the Intended Nationally Determined Contributions (or INDCs, the action each individual government intends to take under the Paris Agreement). The biggest difference compared with last year's report was the emphasis on the need for countries to limit global temperature increase to 1.5 degrees Celsius, which would reduce the danger of "locking-in" carbon-intensive technologies and raising the cost of a global transition to low emissions in the long-term.

However, scientists said that while hitting the high ambition 1.5 target would reduce the impacts of climate change that are already being felt sharply across the planet it would not eliminate them. This year, global temperatures and sea levels rose to record-breaking levels, leading to severe droughts, floods, storms, loss of life, agriculture and the displacement of people.

Need to do better

The report was explicit in its message that countries need to accelerate action before 2020 in order for 2030 levels of global greenhouse gas emissions to be consistent with the longer-term goals of the Paris Agreement. "While members of the G20 are collectively on track to meet their Cancun pledges for 2020, these pledges fall short of creating a sufficiently ambitious starting point to align with the temperature targets of the Paris Agreement," said the report's authors.

On a more optimistic note, McGlade said, "We are seeing global CO₂ (carbon dioxide) levels stagnate for the first time, and we are absolutely able to deliver a transformative pathway." The largest reductions in carbon emissions have taken place in the countries with the highest rates of emissions per unit of GDP. According to the report, China, the European Union and India are expected meet their pledges without purchasing offsets, while Brazil and Japan are expected to meet the majority of their targets. The United States, however, will need to



take further action and purchase offsets to keep up. Saudi Arabia and Russia are lagging behind other countries in their efforts to reduce per capita emissions and were described as “real concerns” by the authors.

China and India’s pledges are framed in terms of greenhouse gas intensity reductions from 2005 levels. China has so far promised a reduction of 40-45% in emissions intensity and is expected to achieve a reduction of at least 42%. Meanwhile, India reports that it achieved a 12% reduction in emissions intensity between 2005 and 2010, while some analysis showed a 17% reduction from 2005 to 2012 (out of a pledged reduction of 20-25% from 2005 to 2020). Overall, the data showed India to be on track for reductions of 28-36% by 2020.

The gap

The report found that global emissions must be no higher than 42 gigatonnes of carbon dioxide equivalent by 2030 to have a chance of limiting average global temperature rise from the pre-Industrial Age to two degrees Celsius by the end of this century; or 39 gigatonnes for 1.5 degrees. The most transformative changes must take place in the building, industrial and transport sectors with energy efficiency savings expected to be the biggest driver of further cuts. Investment in energy efficiency increased globally by 6% to USD221 billion in 2015, indicating that action is already happening. *Hans Olav Ibrekk, policy director for the energy sector of Norwegian Ministry of Foreign Affairs* said the gap could not be closed without reforming the global energy sector. **“The solution to climate change is energy policy,”** he said.

“China will be the biggest leader for environmental change in the world over the next 10 years,” said Erik Solheim, head of UNEP. He praised China for its leadership in bringing renewable energy online (China now owns half of the world’s wind power), reducing the cost of solar energy globally, empowering its Ministry of Environment to punish heavy polluters, and for quickly identifying the Paris Agreement as a huge business opportunity.

“China is tackling its cities and improving the quality of life of its citizens,” Solheim said, adding that the government would need to apply rigorous environmental standards to its overseas infrastructure projects, which have raised concerns over their potential to add to pollution in developing countries.

The rapid rise in electric vehicles in India, as well as China, has come in for praise by the report’s authors. They were also supportive of India’s plan to have dedicated freight corridors so as to move more goods by rail rather than by road, which can cut greenhouse gas and other emissions substantially. **“India’s INDC estimates that these corridors could reduce emissions by about 457 million tonnes of carbon dioxide over 30 years, a figure that could increase if electricity were decarbonised,”** says the report.

Indian Scenario

Almost a fourth of India’s top 200 listed firms have set voluntary emission-reduction targets to transition to a low carbon economy, said a new report released on October 25. India on October 2 ratified the Paris Agreement that aims to restrict global warming within 2 degrees Celsius from pre-industrial times.

Large Indian companies are increasingly looking to set an internal price on carbon as part of risk mitigation, said the report by Carbon Disclosure Project India (CDP India), a not-for-profit environmental data platform. As many as 58 Indian companies responded to requests for information by CDP in 2016, of which 47 were among BSE top 200 companies. Another 11 companies came forward on their own to disclose their climate impact to CDP. The total reported emission from all these large firms totalled 293 million tonnes of carbon dioxide equivalent, CDP said

Encouraging trend

We are enthused to note that the quality of disclosure and efforts by Indian companies are improving year on year. Especially noteworthy is the fact the companies are adopting science-based targets. There is clearly hope and we encourage companies to do more which will future-proof the growth trajectory,” Damandeep Singh, Director, CDP India, said in a statement. The India Climate Change Report 2016 was jointly prepared by CDP India and Environmental Resources Management, a global provider of environmental, health, safety, risk, social consulting services and sustainability related services. Wipro Ltd, one of India’s top information technology services companies, saw a growth of 15% over a five-year period along with a 24% drop in emissions, with overall emissions intensity falling by as much as 33%. The company has introduced new virtualization technologies across its servers, resulting in huge annual energy savings, the report said. Other Indian firms that have demonstrated a decoupling of emissions and growth are Tata Motors and ITC Ltd. However, these targets are lacking in long-term ambition, with just 14% of companies having set goals for 2030 or beyond. It is encouraging that Wipro, Tech Mahindra and Aditya Birla Chemicals have set science-based targets, CDP said.

Ambitious goals

With the ratification of the Paris treaty, India has set ambitious targets for itself. The country intends to affect a 33-35% reduction in greenhouse gas emissions per unit of gross domestic product. Along with emission-reduction targets, local firms are also setting renewable energy targets, CDP said. Nearly 94% of responding companies see risks due to regulations related to climate change. Taxes and regulations, renewable energy requirements and cap and trade schemes are perceived as the top three regulatory risks, according to the CDP report.

New opportunities

At the same time, 89% of responding companies see opportunities arising out of climate change. The industrial sector saw the highest number of opportunities on an average, followed by utilities, financial services and information technology companies. The challenge of climate change and how to address it is now firmly on the corporate agenda, according to CDP. "Given that this data is mostly based on calendar year 2015, and so predates the Paris Agreement, we may reasonably hope to see a jump in longer term targets in the next report, which will be based on data generated after the Paris Agreement," the CDP report said. "The amount of emissions reductions pledged by companies has been increasing steadily from 2011 to 2015 and we hope to see it rise at a faster rate in future years, as company targets become more ambitious in response to the regulatory certainty offered by the Paris Agreement."

THE WORLD'S FIRST HYDROGEN-POWERED PASSENGER TRAIN IS COMING TO GERMANY



The super-quiet Coradia iLint passenger train is powered by hydrogen fuel cells, which emit only steam and condensed water. A hydrogen fuel tank stored on the roof of the train powers the fuel cells to produce electrical energy. Alstom said it hopes its hydrogen-fueled trains can replace Europe's many diesel-burning ones, which are still in wide use despite numerous electrification projects across the continent.

Alstom unveiled the new train at InnoTrans, an annual trade show in Berlin this week. Starting at the end of 2017, the train will run on the Buxtehude-Bremervörde-Bremerhaven-Cuxhaven line in the northwestern German state of Lower Saxony. Lower Saxony's local transportation authority has meanwhile ordered 14 trains of the type. Testing and approval by the German Federal Railway Authority Eisenbahn-Bundesamt will commence in fall 2016 and is expected to be completed by end of 2017.

The Coradia iLint may be the world's first hydrogen-powered passenger train, but it's certainly not the first vehicle to run on hydrogen fuel cells. Stan Thompson, former strategic planner at AT&T and long-term advocate of the use of hydrogen for rail transportation, coined the term "hydrail" in 2004 to describe any type of rail vehicle that uses hydrogen fuel cells. There have been prototypes and hybrid trains in the meantime, most notably in Japan.

This is the latest announcement that points to Germany's efforts to innovate rail travel. Last July, Deutsche Bahn, the largest railway operator in Europe, announced it would be working with Hyperloop Transportation Technologies to bring its futuristic technologies to its train fleet.

GERMAN POWER GRID OPERATOR INSTALLS WORLD'S LARGEST FR3 FLUID FILLED SUBSTATION TRANSFORMER

Transnet BW, a transmission network operator in the German state of Baden-Württemberg, recently installed a 420kV power transformer in one of its substations in south west Germany that is cooled and insulated with Envirotemp™FR3™ Natural Ester Fluid. The substation transformer, which has a power rating of 300MVA with an over load condition of upto 400MVA, is the first in this high voltage category to be filled with a renewable, vegetable-oil-based, natural ester fluid.



“This is particularly important that the bio-oil transformer not only sets standards in terms of technical progress and performance, but also for the protection of humans and the environment,” said Rainer Joswig, CEO of Transnet BW. “The new transformer is an essential building block for a sustainable infrastructure, which ensures the supply of the region for a long time.”

Transnet BW operates and maintains some 3,300 kilometers of high-voltage transmission lines and more than 80 transformers that connect them with regional distribution networks. Its customers and partners consist of several hundred electricity traders and power plant and distribution system operators.

Joswig also noted that, in addition to the environmental benefits, FR3 fluid provides other advantages over mineral oil.

Beyond environmental benefits: Cost savings and increased fire safety

Unlike mineral oil, FR3 fluid also allows high operating temperatures and has twice the flash and fire point which greatly reduces the risk of fires. This capability eliminates the need for fire walls and reduces clearances to buildings. Furthermore, because FR3 fluid is classified as a less flammable fluid by UL and FM Global, the need for deluge and fire mitigation systems are also eliminated. And since it has been rated as ultimately biodegradable, the need to build containment barriers or establish collection contingencies in case of spills is minimized. The improved fire safety and environmental benefits help save substantially on installation and ongoing maintenance costs.

Transnet BW has been investigating the viability of natural ester fluid for use in high voltage transformers for several years. Working in concert with the transformer manufacturer, Transnet BW has tested FR3 fluid for everything from oxidation stability and compatibility with other transformer component materials; to low-temperature performance; to flash and fire points. In April 2013, they conducted additional in-factory, performance tests on the actual transformer prior to installation. After demonstrating its performance in a factory setting, the transformer was installed in a substation and commissioned in early 2014.

Looking ahead: Continued development for FR3 fluid-filled, high-voltage transformers

Transnet BW will continue to monitor performance of the FR3-filled transformer in the coming years. The information that will be collected in Bruchsal will help further the understanding of natural ester fluids performance. Prior to this, the viability and high-performance of FR3 fluid as a transformer coolant and insulating fluid for lower voltage transformers had been well documented through numerous installations. This first-of-a-kind use in the high-voltage category marks a significant mile stone for the use of natural ester fluids in transformers.

PHILIPS AND DUBAI UNVEIL WORLD'S MOST EFFICIENT LED BULB

One of the many benefits of LED light bulbs is that they use much less energy than conventional incandescent bulbs. Thanks to a research partnership with the municipality of Dubai, Philips has developed a range of LED bulbs that are claimed to reduce electricity consumption by up to 90 percent when compared to incandescent bulbs and will last up to 15 time longer, too.



The Dubai Lamp project was aimed at helping to encourage sustainable development and, specifically, contributing to a targeted 30 percent reduction in the city's energy use by 2030.

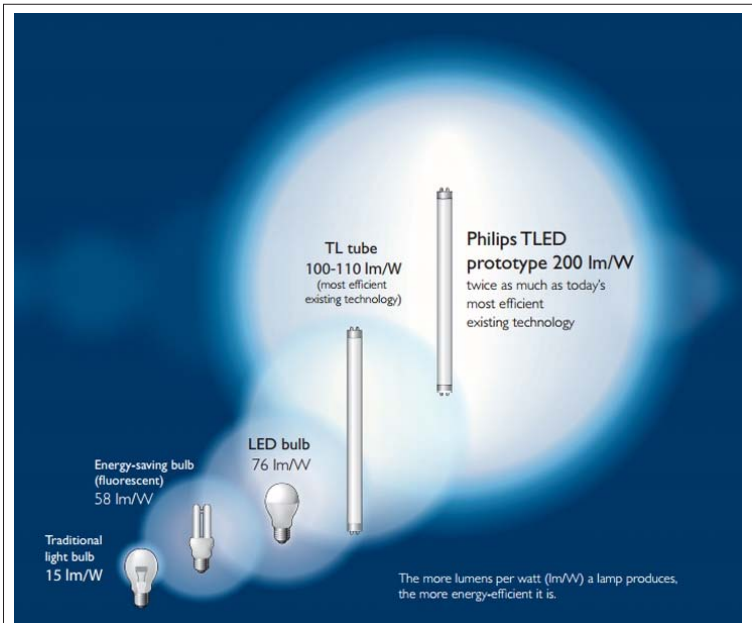
Philips, of course, is no stranger to LEDs, with its **Hue bulbs** among the most well known of smart lighting ranges available and its technology used to illuminate stadia and cities around the world. Working with Dubai Municipality, it's now developed the world's first commercial 200 lumen (lm) per watt LED bulbs, with its next best bulb in this respect said to achieve 101 lm/W.

The Dubai Lamp range comprises four LED bulbs, each of which are available in "cool day light" and "warm white" colors. There's a 1-W, 200-lm E14 candle bulb, a 2-W, 400-lm E27 classic bulb and a 3-W, 600-lm E27 classic bulb.

These are designed to replace 25-W, 40-W and 60-W incandescent bulbs, respectively, and to run off Dubai's 220-240-V mains voltage. Completing the range is a 3-W, 12-V MR16 Spot to replace 50-W, 12-V halogen spot bulbs, and has a lower efficiency than its siblings of 133 lm/W.

The Dubai Lamp was unveiled at the Water, Energy, Technology, and Environment Exhibition this week and is due to be available in Dubai by the end of the year. There are plans to roll it out beyond Dubai, but there's nothing confirmed on this front as yet. Pricing has yet to be set.

Source: Philips



POWERWALL FROM TESLA

Powerwall stores electricity generated by solar panels during the day and makes it available to your home in the evening. This bridges the gap between peak solar and peak demand, allowing you to use your photons when you need them. Combine solar panels and one or more Powerwall home batteries to power your home independently from the utility grid. A net zero energy rating means that your home produces as much energy as it consumes, but is still connected to the utility grid for periods of high demand. In the event of a utility outage, Powerwall can power your entire home or select appliances with an uninterrupted supply of electricity. When installed along with solar panels, Powerwall will allow your home to use solar generated electricity during a utility outage.



Current generation home batteries are bulky, expensive to install and expensive to maintain. In contrast, Powerwall's lithium ion battery inherits Tesla's proven automotive battery technology to power your home safely and economically. Completely automated, it installs easily and requires no maintenance.

How it Works

A typical Powerwall system includes solar panels, an inverter for converting electricity between direct current and alternating current, a meter for measuring battery charge, and in backup applications, a secondary circuit that powers key appliances. Which components are required depends on how you use your home battery.

- **Solar panels** - Panels convert sunlight into electricity that charges Powerwall and powers your home during the day. Without solar, Powerwall can reduce time of use power bills by strategically shifting energy consumption.
- **Powerwall** - The home battery is charged with electricity generated by solar panels or from the utility grid.
- **Inverter** - The inverter converts direct current electricity from solar panels, the grid and Powerwall into the alternating current used by your home's lights, appliances and devices. All Powerwall installations require a compatible inverter. To maximize solar consumption, a meter is also installed to measure solar production and home energy use.
- **Electrical Panel** - Electricity from the inverter is sent to your home's electrical panel. For applications without solar, and night time, electricity generated by the power company is sent from the electrical panel to the inverter to charge the Powerwall.
- **Backup panel and switch** - Some backup installations may require a secondary electrical panel containing the critical appliances and outlets you wish to back up. An electrical switch automatically activates the backup panel during a power company outage. When installed with solar, this switch can keep your solar producing during an outage. Backup is an optional feature when installing to maximize solar or shift energy consumption. Each Powerwall has a 6.4 kWh energy storage capacity, sufficient to power most homes during the evening using electricity generated by solar panels during the day. Multiple batteries may be installed together for homes with greater energy needs.

Specifications

- | | |
|---|--|
| <ul style="list-style-type: none">➤ Technology Wallmounted, rechargeable lithium ion battery with liquid thermal control.➤ Model 6.4 kWh For daily cycle applications➤ Warranty 10 years➤ Efficiency 92.5% round-trip DC efficiency➤ Power 3.3 kW➤ Depth of Discharge 100%➤ Voltage 350 – 450 volts➤ Current 9.5 amperes➤ Compatibility Single phase and three phase utility grid compatible. | <ul style="list-style-type: none">➤ Operating Temperature -20°C to 50°C / -4°F to 122°F➤ Enclosure Rated for indoor and outdoor installation.➤ Installation Requires installation by a trained electrician. DC-AC inverter not included.➤ Weight 97 kg / 214 lbs➤ Dimensions 1302 mm x 862 mm x 183 mm, 51.3" x 34" x 7.2"➤ Certification CE Declaration of Conformity: IEC 62619, IEC 62109-1, IEC/EN 61000, Class B Radiated Directive 2006/66/EC UN 38.3 |
|---|--|

ENERGY CONSERVATION THROUGH ENERGY EFFICIENCY – 21

Recap:

Energy Consumption, Demand Management and Energy Conservation through Efficient Use of Energy is an important activity in Energy Management, as it ultimately makes a better business sense apart from contributions of 'Resources Conservation' and Environmental Protection. Electricity forms a bulk of End Use forms of Energy and a bulk of it goes into providing Mechanical Energy. To sum up, Electricity, be it in Industries or Commercial Establishments or Homes, has two main functions of providing Illumination (20%) and providing Mechanical Energy (80%) through Electric Motors. Efficient use of Electricity through Motors and Motor Driven Systems is large area of concern with a sizable potential to save Energy and the overall Efficiency levels will be decided by the Motors and Driven Systems and controls. Again it is important to understand that almost 60% of the Driven Systems comprise of Pumps, Compressors and Blowers, the remaining comprising of Conveyors, Lifts, Hoists, Cranes and Machine Tools etc.

8. Energy-Efficiency Improvement Opportunities in Electric Motors

Energy Saving Opportunities

When considering energy-efficiency improvements to a **facility's motor systems**, a systems approach incorporating pumps, compressors, and fans must be used in order to attain optimal savings and performance. In the following, considerations **with respect to energy use** and **energy saving opportunities** for a motor system are presented and Pumping, fan and compressed air systems are discussed in addition to the electric motors.

Potential energy-efficiency improvements:

1. Motor Management Plan
2. Maintenance Programme
3. Using of Energy-Efficient Motors
4. Rewinding of Motors
5. Proper Motor Sizing
6. Using Adjustable Speed Drives (ASDs)
7. Power Factor Correction
8. Minimizing Voltage Unbalances

1. Motor Management Plan

A motor management plan is an essential part of a **Plant's Energy Management Strategy**. Having a motor management plan in place can help companies realize long-term motor system energy savings and will ensure that motor failures are handled in a quick and cost effective manner.

The following are the key elements for a sound motor management plan:

1. Creation of a motor survey and tracking programme.
2. Development of guidelines for proactive repair/replace decisions.
3. Preparation for motor failure by creating a spares inventory.
4. Development of a purchasing specification.
5. Development of a repair specification.
6. Development and implementation of a predictive and preventive maintenance program.

2. Maintenance

The purposes of **Motor Maintenance** are to prolong motor life and to foresee a motor failure. Motor maintenance measures can therefore be categorized as either preventative or predictive.

Preventative Measures, include voltage imbalance minimization, load consideration, motor alignment, lubrication and motor ventilation.

Some of these measures are further discussed below. Note that some of them aim to prevent increased motor temperature which leads to increased winding resistance, shortened motor life, and increased energy consumption.

The purpose of **Predictive Motor Maintenance** is to observe ongoing motor temperature, vibration, and other operating data to identify when it becomes necessary to overhaul or replace a motor before failure occurs.

The savings associated with an ongoing motor maintenance program could range from **2% to 30% of total motor system energy use**.

3. Energy-Efficient Motors

Energy-Efficient Motors Reduce Energy Losses through improved design, better materials, tighter tolerances, and improved manufacturing techniques. With proper installation, energy-efficient motors can also stay cooler, may help reduce facility heating loads, and have higher service factors, longer bearing life, longer insulation life, and less vibration.

The choice of installing a premium efficiency motor strongly depends on **Motor Operating Conditions** and the **Life Cycle Costs** associated with the investment.

In general, premium efficiency motors are most economically attractive when replacing motors with annual operation **exceeding 2,000 hours/year**. Sometimes, even replacing an operating motor with a premium efficiency model may have a low payback period.

According to data from the **Copper Development Association**, the upgrade to high-efficiency motors, as compared to motors that achieve the minimum efficiency as specified by the Energy Policy Act of 1992 can have paybacks of less than 15 months for 50 hp motors.

4. Rewinding of motors

In some cases, it may be **cost-effective to rewind an existing energy-efficient motor**, instead of **purchasing a new motor**. As a rule of thumb, when rewinding costs exceed 60% of the costs of a new motor, purchasing the new motor may be a better choice.

When repairing or rewinding a motor, it is important **to choose a motor service center** that follows best practice motor rewinding standards in order to minimize potential efficiency losses.

When best rewinding practices are implemented, **efficiency losses are typically less than 1%**. Software tools can also help identify attractive applications of premium efficiency motors based on the specific conditions at a given plant.

5. Proper motor sizing

It is a persistent myth that oversized motors, especially motors operating **below 50% of rated load**, are not efficient and should be immediately replaced with appropriately sized energy-efficient units. In actuality, several pieces of information are required to complete an accurate assessment of energy savings.

They are the load on the motor, the operating efficiency of the motor at that load point, the **full-load speed** (in revolutions per minute [rpm]) of the motor to be replaced, and the full-load speed of the downsized replacement motor.

The efficiency of both standard and energy-efficient motors typically peaks near 75% of full load and is relatively flat down to the 50% load point. Motors in the larger size ranges can operate with reasonably high efficiency at loads down to 25% of rated load.

There are two additional trends: larger motors exhibit both higher full- and partial-load efficiency values, and the efficiency decline below the 50% load point occurs more rapidly for the smaller size motors.

6. Using Adjustable Speed Drives (ASDs)

Adjustable-speed drives **better match speed to load requirements** for motor operations, and therefore ensure that motor energy use is optimized to a given application. As the energy use of motors is approximately proportional to the cube of the flow rate, relatively small reductions in flow, which are proportional to pump speed, already yield significant energy savings.



Adjustable-speed drive systems are offered by many suppliers and are available worldwide. We have earlier seen an overview of savings achieved with ASDs in a wide array of applications; typical energy savings were shown to vary between 7% and 60% with estimated simple payback periods ranging from 0.8 to 2.8 years.



7. Power Factor Correction

Power factor is the ratio of working power to apparent power. It measures how effectively electrical power is being used. A **high power factor signals** efficient utilization of electrical power, while a **low power factor** indicates poor utilization of electrical power.

Inductive loads like transformers, electric motors, and HID lighting may cause a low power factor.

The power factor can be corrected by **minimizing idling of electric motors** (a motor that is turned off consumes no energy), replacing motors with premium-efficient motors, and installing capacitors in the AC circuit to reduce the magnitude of reactive power in the system.

8. Minimizing voltage unbalances

A voltage unbalance **degrades the performance** and **shortens the life** of three-phase motors. A voltage unbalance causes a **current unbalance**, which will result in torque pulsations, increased vibration and mechanical stress, increased losses, and motor overheating, which can reduce the life of a motor's winding insulation.

An example of Effects of voltage unbalance on 5 hp motor:

Characteristic	Performance		
	415	415	415
Average voltage	415	415	415
Percent unbalanced voltage	0.3	2.3	5.4
Percent unbalanced current	2.4	17.7	40
Increased temperature (°C)	< 1	11	60

Voltage unbalances may be caused by faulty operation of power factor correction equipment, an unbalanced transformer bank, or an open circuit. A rule of thumb is that the voltage unbalance at the motor terminals should not exceed 1% although even a 1% unbalance will reduce motor efficiency at part load operation. A 2.5% unbalance will reduce motor efficiency at full load operation.

By regularly monitoring the voltages at the motor terminal and through regular thermographic inspections of motors, voltage unbalances may be identified. It is also recommended to verify that single-phase loads are uniformly distributed and to install ground fault indicators as required.

The typical payback period for voltage controller installation on lightly loaded motors **can be taken as 2 to 2.5 years.**

14 energy-efficiency improvement opportunities in pumping systems

Detailed energy assessment

Pump systems consist of pumps, driver, pipe installation and controls (such as ASDs or throttles) and are a part of the overall motor system. Below some of the energy efficiency opportunities for the pumping system are presented.

Understand standard that covers the assessment of pumping systems, which are defined as one or more pumps and those interacting or interrelating elements that together accomplish the desired work of moving a fluid.

Here below the procedure of conducting a 14 detailed energy assessment of the pumping system as well as the energy efficiency opportunities are described.

1. Maintenance
2. Monitoring
3. Controls
4. Reduction of demand

5. More efficient pumps
6. Proper pump sizing
7. Multiple pumps for varying loads
8. Impeller trimming (or shaving sheaves)
9. Adjustable speed drives (ASDs)
10. Avoiding throttling valves
11. Proper pipe sizing
12. Replacement of belt drives
13. Precision castings, surface coatings or polishing
14. Improvement of sealing

1. Maintenance

Inadequate maintenance lowers **Pump System Efficiency**, causes pumps to wear out more quickly and increases costs. Better maintenance will reduce these problems and the most important – **to save energy**.

Proper maintenance includes the following:

- Replacement of worn impellers, especially in caustic or semi-solid applications.
- Bearing inspection and repair.
- Bearing lubrication replacement, once annually or semiannually.
- Inspection and replacement of packing seals.
- Inspection and replacement of mechanical seals.
- Wear ring and impeller replacement.
- Pump/motor alignment check.
- The largest opportunity is usually to avoid throttling losses.

Typical energy savings for operations and maintenance are estimated to be **between 2% and 7% of pumping electricity use**. The payback usually is less than one year.

2. Monitoring

Monitoring in conjunction with operations and maintenance can be used to detect problems and determine solutions to create a more efficient system. Monitoring can determine clearances that need be adjusted, indicate blockage, impeller damage, inadequate suction, operation outside preferences, clogged or gas-filled pumps or pipes, or worn out pumps.

Monitoring should include:

- Wear monitoring
- Vibration analyses
- Pressure and flow monitoring
- Current or power monitoring
- Differential head and temperature rise across the pump (also known as thermodynamic monitoring)
- Distribution system inspection for scaling or contaminant build-up

One of the best indicators to follow for monitoring is specific energy or power consumption as a function of the flow rate.

3. Controls

The objective of any control strategy is **to shut off unneeded pumps or to reduce the load of individual pumps**. Remote controls enable pumping systems to be started and stopped relatively quickly and accurately, and reduce the required labour with respect to traditional control systems.

4. Reduction of demand

Holding tanks can be used to equalize the flow over the production cycle, enhancing energy efficiency and potentially reducing the need to add pump capacity. In addition, bypass loops and other unnecessary flows should be eliminated.

Energy savings may be **as high as 5-10% for each of these steps.**

Total head requirements can also be reduced by lowering process static pressure, minimizing elevation rise from suction tank to discharge tank, reducing static elevation change by use of siphons and lowering spray nozzle velocities.

5. More efficient pumps

Pump efficiency may degrade 10% to 25% in its lifetime. Industry experts however point out that this degrading performance is not necessarily due to the age of the pump but can also be caused by changes in the process which may have caused a mismatch between the pump capacity and its operation.

Nevertheless, it can sometimes be more efficient **to buy a need pump**, also because newer models are more efficient.

A number of pumps are available for **specific pressure head and flow rate capacity requirements.** Choosing the right pump often saves both in operating costs and in capital costs (of purchasing another pump). For a given duty, a pump that runs at the highest speed suitable for the application will generally be the most efficient option with the lowest initial cost.

Exceptions include slurry handling pumps, high specific speed pumps or in applications where the pump needs a very low minimum net positive suction head at the pump inlet.

Replacing a pump with a new efficient one reduces energy use **by 2% to 10%.** Higher efficiency motors have been shown to increase the efficiency of the pump system **2% to 5%.**

6. Proper pump sizing

A pump may be incorrectly sized for current needs if it operates under throttled conditions, has a high bypass flow rate, or has a flow rate that varies more than 30% from its best efficiency point flow rate (U.S. DOE-OIT, 2005). Where peak loads can be reduced, pump size can also be reduced. A smaller motor will however not always result in energy savings, as these depend on the load of the motor.

Only if the larger motor operates at a low efficiency, replacement may result in energy savings. Pump loads may be reduced with alternative pump configurations and improved operations and management practices.

When pumps are dramatically oversized, speed can be reduced with gear or belt drives or a slower speed motor. This practice, however, is not common. Paybacks for implementing these solutions are less than one year. Oversized and throttled pumps that produce excess pressure are excellent candidates for impeller replacement or “trimming,” to save energy and reduce costs.

Correcting for pump oversizing can save 15% to 25% of electricity consumption for pumping

7. Multiple pumps for varying loads

The use of multiple pumps is often the most cost-effective and most energy-efficient solution for varying loads, particularly in a static head-dominated system. Alternatively, adjustable speed drives could be considered for dynamic systems. Parallel pumps offer redundancy and increased reliability.

The installation of **parallel systems for highly variable loads** on average would save 10% to 50% of the electricity consumption for pumping

8. Impeller Trimming (or shaving sheaves)

Trimming reduces the impeller’s tip speed, which in turn reduces the amount of energy imparted to the pumped fluid; as a result, the pump’s flow rate and pressure both decrease.

A smaller or trimmed impeller can thus be used efficiently in applications in which the current impeller is producing excessive heat. In the food processing, paper and petrochemical industries, trimming impellers or lowering gear ratios is estimated to save as much as 75% of the electricity consumption for specific pump applications.

9. Adjustable speed drives (ASDs)

ASDs better match speed to load requirements for pumps. As for motors, energy use of pumps is approximately proportional to the cube of the flow rate and relatively small reductions in flow may yield significant energy savings. **New installations may result in short payback periods.**

In addition, the installation of ASDs **improves overall productivity, control and product quality, and reduces wear on equipment**, thereby reducing future maintenance costs.

Similar to being able to adjust load in motor systems, including modulation features with pumps is estimated to save between 20% and 50% of pump energy consumption, at relatively short payback periods, depending on application, pump size, load and load variation.

As a general rule of thumb, unless the pump curves are exceptionally flat, a 10% regulation in flow should produce pump savings of 20% and 20% regulation should produce savings of 40%.

10. Avoiding throttling valves

Variable speed drives or on-off regulated systems always save energy compared to throttling valves. **The use of these valves should therefore be avoided.** Extensive use of throttling valves or bypass loops may be an indication of an oversized pump.

11. Proper pipe sizing

Energy may be saved by reducing losses due to friction **through the optimization of pipe diameters.** The frictional power required depends on flow, pipe size (diameter), overall pipe length, pipe characteristics (surface roughness, material, etc.), and properties of the fluid being pumped.

Correct sizing of pipes should be done **at the system design stages where costs may not be restrictive.**

12. Replacement of belt drives

Most pumps are **directly driven.** However, some pumps use standard V-belts which tend to stretch, slip, bend and compress, which lead to a loss of efficiency. Replacing standard V-belts with cog belts can save energy and money, even as a retrofit.

It is even better to replace the pump by a direct driven system, **resulting in increased savings of up to 8%** of pumping systems energy use with payback periods as short as 6 months.

13. Precision castings, surface coatings or polishing

The use of **castings, coatings or polishing** reduces surface roughness that in turn, increases energy-efficiency. It may also help maintain efficiency over time. This measure is more effective on smaller pumps.

14. Improvement of sealing

Seal failure accounts for up to 70% of pump failures in many applications. The sealing arrangements on pumps will contribute to the power absorbed. Often the use of gas barrier seals, balanced seals, and no-contacting labyrinth seals can help to optimize pump efficiency.

(To be continued)

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HUMOUR

Friends...nothing serious about it....just laugh and keep going..be optimistic....!

A couple was having dinner at a fancy restaurant. As the food was served, the husband said, “the food looks delicious, let’s eat.”

Wife: honey ... you say a prayer before eating at home.

Husband: that’s at home sweetheart ... here the chef knows how to cook.

Best Slogan on a MAN’s T-Shirt : “Please Do Not Disturb me, I am Married and already very Disturbed”

Reserved and the Deserved

Mr. Modi to Obama: How do you manage to grow your country so nicely.. ????

Obama : It’s because of Indians . . .

Mr. Modi shocked : How because of Indians . . ?

Obama: You give jobs to Reserved Indians and we give the jobs to the Deserved Indians.

“Efficiency is doing better what is already being done. Effectiveness is deciding what to do better.”

- PETER F. DRUCKER

BIG, BEAUTIFUL AND SUSTAINABLE – 10 OF THE WORLD’S MOST ENERGY EFFICIENT OFFICES - 5

EMPIRE STATE BUILDING, NEW YORK (USA)



One of the world’s most famous buildings, The Empire State Building in New York has also inconspicuously undergone a \$550m renovation that saw it earn the LEED Gold Certification in 2011.

The building’s environmental upgrade is the largest of its kind to take place in the US and helped cut its annual energy use by \$4.4m. In the next 15 years the changes are

expected to reduce the building’s carbon footprint by 105,000 tonnes – the equivalent of taking 20,000 cars off the road!

As well as improving its insulation systems and implementing energy saving technologies and products, one of the biggest changes the building experienced was the refurbishment of all 6514 of its windows. They were refitted and reinstalled to stop large amounts of energy being lost. The windows were replaced using 96% of the buildings original glass to make the new windows four times more efficient.

(To be continued...)

THE WORLDS TOP 10 MOST INNOVATIVE COMPANIES IN ENERGY - 5

U.S. MARINE CORPS (EXPEDITIONARY ENERGY OFFICE)



Unrestrained by politics, the U.S. Marine Corps is a quiet player on the front lines of clean-energy innovation. Over the past few years, the Expeditionary Energy Office, or E2O, has tested radical battlefield energy systems with the aim of curtailing dependence on fossil fuels during missions. The result: dozens of hybrid innovations that have shown the potential to cut diesel use in half on the battlefield, and—hopefully—as a bonus, sustain longer missions and reduce soldiers’ vulnerabilities.

(To be continued...)

ALLERGY TYPES

Learn the types of allergies including food allergies, seasonal allergies, pet allergies, and many more.

Food Allergies

Food Allergies and Food Intolerance

Food allergies or food intolerances affect nearly everyone at some point. People often have an unpleasant reaction to something they ate and wonder if they have a food allergy.

Milk Allergy

If you suffer from a milk allergy, strictly avoiding milk and food containing milk and milk products is the only way to prevent a reaction, which can include immediate wheezing, vomiting, and hives.

Egg Allergy

Egg allergies — especially to egg whites — are more common in children than in adults and reactions range from mild to severe.

Wheat Allergy

If you are allergic to any wheat protein strictly avoiding wheat and wheat products is the only way to prevent a reaction, which can include stomach upset, eczema, allergic rhinitis, bronchospasm (asthma-like symptoms) and even anaphylaxis.

Nut (Peanut) Allergy

If you suffer from a nut allergy, strictly avoiding nuts, including peanuts and tree nuts like cashews and walnuts, and food containing nuts is the only way to prevent a reaction.

Fish Allergy

If your doctor is able to identify exactly which type of fish causes your allergies, then you only need to eliminate that species of fish from your diet. For the majority of fish allergy sufferers, this is not an option and all fish must be avoided.

Shellfish Allergy

Learn about shellfish allergies and which foods to avoid.

Sulfite Allergy

Sulfites are a group of sulfur-based compounds that may occur naturally or may be added to food as an enhancer and preservative. The FDA estimates that one out of 100 people is sensitive to the compounds.

Soy Allergy

Soy allergies start with soybeans. Soybeans are legumes. Other foods in the legume family include navy beans, kidney beans, string beans, black beans, pinto beans, chickpeas (garbanzo or chichi beans), lentils, carob, licorice, and peanuts.

Casein Allergy

If a glass of milk or a slice of pizza causes swollen lips, hives, or other significant symptoms, you may have an allergy to casein, a protein in milk.

SEASONAL ALLERGIES

Spring Allergies

Spring is the time of year that we normally think of when it comes to seasonal allergies. As the trees start to bloom and the pollen gets airborne, allergy sufferers begin their annual ritual of sniffing and sneezing.

Summer Allergies

Although spring most readily comes to mind when we think of allergies, many of the same allergic triggers that can make us miserable in the spring persist into summer.

Fall Allergies

The allergy triggers might be slightly different, but they can be just as misery-inducing as the flower pollen that fills the air in the spring and summer.

Winter Allergies

Here are some common causes of winter allergies, and a few tips for managing your symptoms.

PET ALLERGIES

Dog Allergy

For a person with dog allergies, life in a dog-loving country isn't easy. Nearly 40% of U.S. households have a dog. Dog dander gets everywhere, including places where dogs have never set a paw.

Cat Allergy

Here are some answers — what you need to know about cat allergies, from causes to treatments.

OTHER ALLERGIES

Hay Fever

Hay fever is an immune disorder characterized by an allergic response to pollen grains and other substances. Also known as allergic rhinitis, there are two types: seasonal, which occurs only during the time of year in which certain plants pollinate, and perennial, which occurs all year round.

Allergic Conjunctivitis (Pink Eye)

Pink eye caused by bacteria, viruses, or STDs can spread easily from person to person but is not a serious health risk if diagnosed promptly; allergic conjunctivitis is not contagious.

Hives (Urticaria)

Hives, also known as urticaria, are an outbreak of swollen, pale red bumps, patches, or welts on the skin that appear suddenly — either as a result of allergies, or for other reasons.

Allergies to Poison Ivy, Oak, and Sumac

Poison ivy, poison oak, and poison sumac are plants that contain an irritating, oily sap called *urushiol*. Urushiol triggers an allergic reaction when it comes into contact with skin, resulting in an itchy rash, which can appear within hours of exposure or up to several days later.

Allergies to Insect Stings (Bee Stings)

Bee, wasp, yellow jacket, hornet, or fire ant stings are the insect stings that most often trigger allergies. However, most people are not allergic to insect stings and may mistake a normal sting reaction for an allergic reaction.

Mold Allergy

People with mold allergies, however, may have a reaction if exposed to too much of the fungus.

Pollen Allergies

For most people, a change of seasons signals the beginning of long, lazy days or cool, crisp evenings. But for the one in 10 Americans who suffers from pollen allergies, changing seasons can mean misery.

Sun Reactions of the Skin

Most people's skin will burn if there is enough exposure to ultraviolet radiation. However, some people burn particularly easily or develop exaggerated skin reactions to sunlight.

Aspirin Allergy (Salicylate Allergy)

Salicylates are chemicals found naturally in plants and are a major ingredient of aspirin and other pain-relieving medications. They are also found in many fruits and vegetables as well as in many common health and beauty products.

Cosmetic Allergy

Although cosmetics can help us feel more beautiful, they can cause skin irritation or allergic reactions. Certain ingredients used in cosmetics, such as fragrances and preservatives, can act as allergens, substances that trigger an allergic reaction.

Nickel Allergy

A nickel allergy is a skin reaction that develops after exposure to nickel or items containing the metal.

Drug Allergy

Many drugs can cause adverse side effects, and certain medicines can trigger allergic reactions. In an allergic reaction, the immune system mistakenly responds to a drug by creating an immune response against it.

Dust Allergy

Life with dust allergies — whether they're yours or a family member's — comes with a load of questions. For instance, might a dust allergy explain your child's never-ending cold symptoms?

Chemical Allergy

They promise to make your skin soft, your hair shiny, and your laundry springtime fresh, but for some people the chemicals in shampoos, cosmetics, and detergents trigger allergic skin reactions.

Penicillin Allergy

A penicillin allergy is an allergic reaction that occurs when your body's immune system overreacts to penicillin antibiotics. A penicillin allergy is an allergic reaction that occurs when your body's immune system overreacts to penicillin antibiotics.

Website: <http://www.webmd.com/allergies/guide/allergy-symptoms-types>

HUMOUR

Friends...nothing serious about it....just laugh and keep going..be optimistic....!

Jokes

Wife: Shall I prepare Curry or Soup today?

Husband: First make it, we'll name it later.

A frustrated husband in front of his laptop: Dear google, please do not behave like my wife...Please allow me to complete my sentence before you start guessing & suggesting.

A married man's prayer: Dear God, You gave me childhood, You took it away You gave me youth, You took it away. You gave me a wife ... It's been years now, so just reminding You.

A man brings his best buddy home for dinner unannounced at 5:30 after work.

His wife begins screaming at him and his friend just sits and listens in. "My hair & makeup are not done, the house is a mess, the dishes are not done, I'm still in my pyjamas and I can't be bothered with cooking to night ! What the hell did you bring him home for?"

Husband answers "Because he's thinking of getting married"

Employee: Sir You are like a lion in the office! What about at home ???

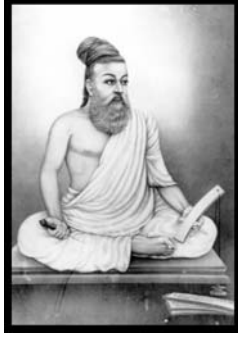
Boss: I am a lion at home too, But there we have a lion tamer !!!

There is nothing so useless as doing efficiently that which should not be done at all.

- PETER F. DRUCKER

TIRUKKURAL AND MANAGEMENT IN A 'NUTSHELL' - 44

We are aware that the Government has initiated a large scale economic measure to clean up the hoarded money and the black money from the system and the entire ground level operations are carried out through the Banks in the country. Some alarming and fraudulent activities have been brought to light from some of the prestigious Banks and the officials and the illegal activities, for a consideration, have been indulged in due to greed and blind hope that they will escape. There are reports that there have been sizable number of such activities, though only a few have come to light and many more might get caught after the verifications in due course. Any breach of trust or ill dead will always bring ill fame and punishment sooner or later is the law of Justice. Tiruvalluvar deals with this subject in one complete Adhikaram and few of the Kurals are given below to establish the Moral of Kural.



Theevinaiyaar Anjaar; Vizhumiyar Anjuvar
Theevinai Ennum Serukku *Kural 201*

தீவினையார் அஞ்சார் விழுமியார் அஞ்சுவர்
தீவினை என்னும் செருக்கு குறள் 201

“The evil fear not the folly called ill dead or sin: but the worthy flee from it.”

Theeyavai Seithar Keduthal Nizhalthannai
Veeyathu Adiurainth Thatru *Kural 208*

தீயவை செய்தார் கெடுதல் நிழல்தன்னை
வீயாது அடிஉறைந் தற்று குறள் 208

“As the shadow leaveth not a man but draggeth his footsteps wherever he goeth, even so do evil deeds pursue their author and work his destruction.”

Thannaithan Kaadhala naayin
Enaiththondrum
Thunnarkka Theevinaip Paal *Kural 209*

தன்னைத்தான் காதல னாயின்
எனைத்தொன்றும்
துன்னற்க தீவினைப் பால் குறள் 209

“If a man loves his own self, let him not incline his mind towards evil in any degree.”

HOME FESTIVALS - 1

தை - Thai (Mid-January/Mid-February)

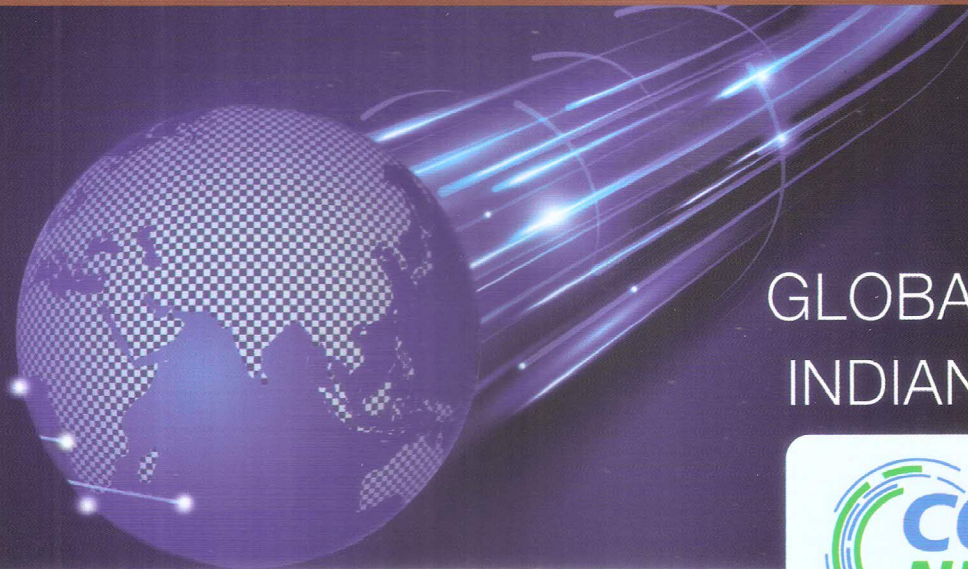


At left the Sun god, Surya, is being worshiped with the outdoor cooking of a large pot of rice from the recent harvest. The overflowing of the dish is called “pongalo-pongalo”, and thus this festival is known as Thai Pongal. Other crops, like sugarcane, bananas and turmeric, are also offered. *Kolams* (hand-made rice flour patterns) are drawn in the form of the chariot, with the Sun and Moon in the center. On this day cows and other animals are decorated and fed special foods, and their owners prostrate to them. Crows and other birds are offered food on leaves of turmeric. Sisters pray for the welfare of brothers, and elders bless the children. Thai Pongal is celebrated by the poorest farmers and the wealthiest householders.

(To be continued)

Take the first step in faith. You don't have to see the whole staircase, just take the first step.

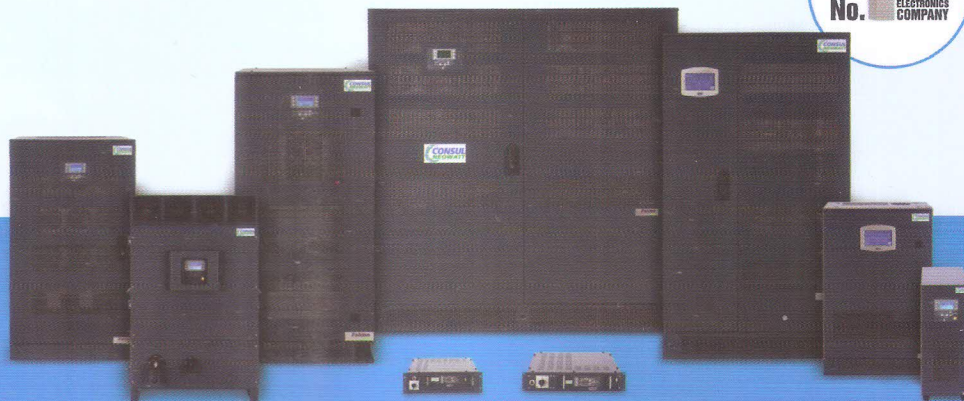
- MARTIN LUTHER KING JR.



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- ★ Falcon UPS for international markets launched at Hannover Messe 2015 in Germany
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