ELECTRICAL INSTALLATION ENGINEER

NEWS LETTER

TAMILNADU ELECTRICAL INSTALLATION ENGINEERS' ASSOCIATION 'A' GRADE (Regn. No. 211/1992)
Old No.82 / New No. 123, Lloyds Enclave, Avvai Shanmugam Road, Royapettah, Chennai - 600 014.
Phone : 2811 1300 Email : tnagrade@gmail.com Website : www.teiea.com

ISSUE NO. 137	VOL : No. 12/2017	MONTHLY ISSUE NO. 7	PRIVATE CIRCULATION ONLY	JULY 2017

EDITORIAL

Dear Members, Fellow Professionals and Friends,

Seasons Greetings To One And All!

The month of July starts with the introduction of GST moving the entire country with a single Tax regime as against the complex and multiple taxes that existed before. This is considered as a great reform aimed towards Economic progress and smoother business conditions and wider business opportunities. There are criticisms about Tax rates for some of the critical items and reservations about ease of doing business, ease of managing the tax returns and the real benefits etc, but what is clearly visible is **'NATIONWIDE'** uniformity in taxation and easier and faster movement of goods all over the country. Some of the comments by the experts that it will contribute to productivity gains and higher GDP growth by improving the ease of doing business, unifying the national market and enhancing India's attractiveness as a foreign investment destination and will support higher government revenue generation through improved tax compliance etc are all very encouraging. It is further said that the GST is based on self-compliance with the input tax credit as a powerful incentive to businesses to step into the tax fold. The Input tax credit can curb inflation by avoiding tax-on-tax and it is believe that most businesses would pass on the benefits of input tax credit to consumers so that inflation would be curbed. Another important and interesting aspect is that the GST Council comprising of all states and Finance ministries and officials, is expected to meet every month to review and implement necessary corrections as found legitimate and necessary. This aspect can probably take care of anomalies if there are any. Indian Businesses, Industries and all the people should feel committed to ensuring the success of GST for boosting India's growth and development.

World Population Day falls on 11th of July. What was once a concern for India has turned out to be advantageous as India has the large population of youth and aging of population is a great concern for many countries of the World including China. In order to make the advantage beneficial, efforts are rightly on in our Country to increase the Knowledge and Skill levels of the young population so that they can contribute substantially to our goal of attaining the status of Economic Super Power. It is a fact that India still engages around 60% of its population in Agriculture and faster **'Mechanization of Agriculture'** can help better utilization of man power for higher generation of wealth.

July is also the month when we can remember and celebrate Swami Vivekananda as his **"Samadhi"** day falls on 4th July. He was a Nationalist with total faith and conviction about the greatness of our culture spread across the length and breadth of the country spanning from Himalayas to Kanyakumari and Bengal to Punjab. He travelled widely within the country and outside and spread the Message across the World within his short span of life. He had the Vision and confidence almost 125 years ago, that India will lead the World through its Spiritual supremacy which is based on both tolerance and universal acceptance. Celebration of the **'YOGA DAY'** the world over is a fitting tribute to him as he believed and advocated both a Strong Mind and A Strong Body for progress and prosperity.

We thank all those members who have helped us by participating in the advertisement appearing for the issue June 2017 – Universal Earthing Systems Pvt. Ltd., Pentagon Switchgear Pvt. Ltd., Pentagon Power Solutions, Alfa Switchgear (I) Pvt. Ltd., Ashlok Safe Earthing Electrode Ltd., Consul Neowatt Power Solutions Pvt. Ltd., FLIR Systems India Pvt. Ltd., Supreme Power Equipment Pvt. Ltd., Elmettlerr, Dehn India Pvt. Ltd., Galaxy Earthing Electrodes (P) Ltd., Power Cable Corporation, Wilson Power and Distribution Technologies Pvt. Ltd., Safvolt Switchgears Pvt Ltd.

EDITOR

Arise, awake and do not stop until the goal is reached.

- SWAMI VIVEKANANDA

ELECTRICAL
INSTALLATION ENGINEER

President :
S.D. POONGUNDRAN
Secretary :
S. GOPALAKRISHNAN
Treasurer :
M. BALAMURUGAN

Editor : G. VENKATESH
Advisor: S. MAHADEVAN
Printer: M. VENKATARAMAN

CONTENTS

MEMBERS DETAILS

S.No.	Company Name	District	Contact No.	License No.
271.	Kamalam Elec. Engg. Contractors	Thanjavur	04362-271993, 94422 71265	EA 2077
272.	Arun Enterprises	Theni	94423 97134	EA 1867
273.	Sun Power Enginears	Thiruppur	0421-4350131, 98430 27586	EA 2259
274.	Sri Varagaa Electricals	Thiruvallur	73732 29333	EA 2759
275.	Kutsun Enterprises	Tuticorin	0461-2324334, 94431 50291	EA 2419
276.	Nataraja Enterprises	Tuticorin	98421 22397, 98429 52397	ESA 182
277.	SPIC Ltd.	Tuticorin	0461-2355401, 99944 88434	ESA 259
278.	Global Technics Solution	Tirunelveli	0462–2341333,98943 48515	EA 3034
279.	L & K Electrical Enterprises	Trichy	94434 01640	EA 1631
280.	Power Electrical Works	Trichy	0431-2531909, 94431 53290	EA 2161
281.	Pushpam Electro Tech	Trichy	94437 82555	EA 2551
282.	CMC College & Hospital	Vellore	0416-2282073, 97913 26175	EA 1077
283.	Johnsons Electrical Tradings	Vellore	044-24798280, 96001 64215	EA 3064
284.	N. Vasu	Vellore	94434 45837, 98942 99787	EA 2738
285.	Shree Engineers	Vellore	044-42051592, 98941 75769	ESA 285

KNOW THY POWER NETWORK - 118

Let me start with a "Tail Piece" to my article on Microgrids. It may be tilted as **"Electricity at Crossroads".**

You cannot avoid changes in the present electricity front because change is the "Byword" for this industry for sometime. Perhaps today we are facing many changes that makes it very difficult to predict anything. Let us view the present scenario.

Now many agencies enter into the forum of "Electricity", which was the sole propriety or monopoly area of government bodies earlier. Now this industry sector has been opened to many players – government, regulatory and private players. You may be eager to know what brings these sudden changes?

Environmental Factors, stringent climate change regulations, competitive solar and wind power are the chief **"Game Changing Factors"**; added to this is the sudden bust of nuclear power business at the international level and the retirement of large ageing thermal and hydel power stations on account of poor economic viability and lower efficiency. In this scenario, Microgrids and Distributed Energy Sources make a **"Wild Entry"**. All these make the consumers to be the future lords of electricity sector; they will be totally free to generate electricity to meet their needs and that of society as well with the help of net metering; they can sell power to other needy persons / agencies and get notable revenues in the process.

The present changes lower the significance attached to centralised grid system and take its **"sheen off"**. It will be made to work as a **"stand-by"** or a backup to Microgrids. The ageing bulk power stations are slowly treading their path towards extinction and join the list of **"dinosauer"** very soon.

End of Nuclear Power

The original developer and supplier of nuclear reactors Viz. Westing house went bust in March. The closure process of nuclear power stations in USA has already been started; this process is currently under progress in Germany. UK has already loses interest in nuclear power plants because of its loss of its expertise. France, the role survivor of this closure process, still finds it difficult to run its nuclear power plants because of its soaring debts and high cost of power. In Asia, Japan is no exception; since Fukushima accident, its nuclear power plants remain **"Frozen"**. In India, the nuclear power contribution to total energy mix is of miniscule nature only. In this situation, renewable energy sources try to make a large scale presence in the power sector.

Cost Comparison

You may be eager to view the current generating costs of all these energy sources.

- *Thermal power from coal* — *Rs. 4 / Unit*
- *Nuclear power from the existing power stations* — *Rs. 4-5 / Unit (app.)*
- *Future nuclear power stations* — *Rs. 7-12 / Unit*

Renewable Energy Sources

- *Solar Power —— Rs. 2.62 / Unit*

It may still go below this rate and touch Rs. 1.50 in the near future Cost of wind power remain more or less in the same range of solar power.

Let us move further. The present day activities in the power sector may be grouped into two categories – (i) Before the meters of consumer (ii) After the meters of End users (consumers). Among the activities that happen before the meters are

- Large scale development of distributed energy sources and renewable energy sources
- Arrangements for emergency or backup power supply

Among other things, the behind the meter activities include Microgrids, Energy Storage, Electrical Vehicle Charging and Development of Various Solar Power generating devices like roof top solar, community solar and bulk solar power stations and Wind electric generators of different types. At the consumers premises, level Home energy management system plays an important role. Not only it controls the energy consumption in the homes but also provides energy consumption data, separated by usage type such as space conditioning, appliances, electric vehicles, lighting and others. A same situation holds good for the industries also. It also provides the information on the generation side also; among them are the energy produced by wind and solar assets in the homes.

To make the long story short, let me repeat the happenings in electric power sector thus far.

- Coal, as a fossilfuel for power generation is on its way to extinction. It is expected that it will not survive beyond 2030 because of its unfriendliness to the environment and its high cost.
- Oil and Natural gas will tread the same path as coal before 2030. i.e. these energy sources may not see the light of the day beyond 2030, due to the closure pressure impressed on them.
- Nuclear power generation is already on its way to extinction. This process cannot be reverted because of its poor economic viability.
- Hydel power stations – It will be very difficult to build and run these stations. It is mainly due to the very high costs and stiff environmental regulations.
- Renewable energy sources like Wind power, Solar power and Biomass power are two remaining options available. Among this, the wind power meet stiff opposition from wild life group which try to limit or ban wind electric generators in the areas where higher levels of birds and bat strikes occur.

So also with the construction of large pylons used for the transmission of bulk electric power. Wild life protection activists push to stop / remove these facilities.

Finally we are limited with renewable energy sources only. In this regard microgrids and distributed energy sources independent distribution system operators and bulk energy storage systems operators assume greater significance. As the use of traditional energy sources are very much limited / restricted, the consumers have to understand how electricity is generated, distributed and consumed / stored. They have to interact and work together with their power distributors to solve many issues. This is how the new face of electrical sector will look like. The future for the electricity consumers and power generating and distributing companies will be challenging and exciting.

Would you agree to my views or see differently?

With this, I conclude my article on **"Microgrid"**.

(To be continued...)

V. Sankaranarayanan, B.E., FIE,
Former Addl. Chief Engineer/TNEB
E-mail: vsn_4617@rediffmail.com
Mobile: 98402 07703

SPIKE IN CLEAN ENERGY JOBS

Renewable energy sector will require three lakh more workers in the next five years

According to the study, India's clean energy goals have the potential to generate around 34,500 more jobs in the wind power industry.

India's ambitious aim to install 160 GW of renewable energy by 2022 will have a positive impact on the country's jobs market, a new study has predicted.

The study says that more than 300,000 full-time workers will be needed in these five years and there's potential to create around one million employment opportunities.

Of the many segments of the renewables sector, the labour-intensive rooftop solar component will employ as much as 70 percent of the new workforce, creating seven times more jobs than large-scale projects such as solar farms, said the study titled **"Greening India's Workforce: Gearing Up For Expansion of Solar and Wind Power in India"**.

The report, published this month by the **Council on Energy, Environment and Water** (CEEW), a New Delhi-based think-tank, and the **Natural Resources Defense Council** (NRDC), a New York-based environmental advocacy group, said that the strong growth in the domestic solar manufacturing industry could provide full-time employment for an additional 45,000 people in India.

The study estimated that India's clean energy goals had the potential to put 34,583 people to work in wind power, 58,647 in utility-scale solar farms and 237,980 in rooftop solar energy jobs over the next five years. The solar energy jobs will be distributed across India, with Maharashtra and Uttar Pradesh setting the pace. The wind sector jobs, like wind power capacity, are likely to be concentrated in a few states that have high wind potential.

"CEEW and NRDC's study captures a new dimension in accurately assessing manpower requirements in the solar and wind domains," **Praveen Saxena**, *Chief Executive Officer* of **Skill Council of Green Jobs**, said in a statement.

"This study builds on earlier analyses on the subject considering national objectives to meet India's international clean energy commitments. It makes the path of Skill Council of Green Jobs more clear and visible in terms of capturing the opportunity of employability in India's solar and wind sector". NRDC and CEEW have annually surveyed India's solar and wind companies, developers and manufacturers over the past three years to collect market-based information on jobs created, workforce employed and the skills required to achieve India's renewable energy goals.

Key Recommendations - Based on these observations, the June 2017 study has listed key recommendations for the federal and provincial governments. It has suggested a greater impetus and policy priority to rooftop solar to create renewable energy jobs, initiative to support development of training centres led by the private sector to source construction jobs locally since solar jobs are distributed among states.

Focus on 'Windy' States - It also suggests developing wind power training centres based on state-specific wind targets in eight windy states, and target a strong domestic solar manufacturing industry to provide employment to an additional 45,000 people in India.

India's solar and wind energy sectors employed more than 21,000 people in 2016-17. An additional 25,000 people will be employed over the coming year, the study predicted. India's clean energy workforce comprises solar installers, maintenance workers, engineers, technicians and performance data monitors.

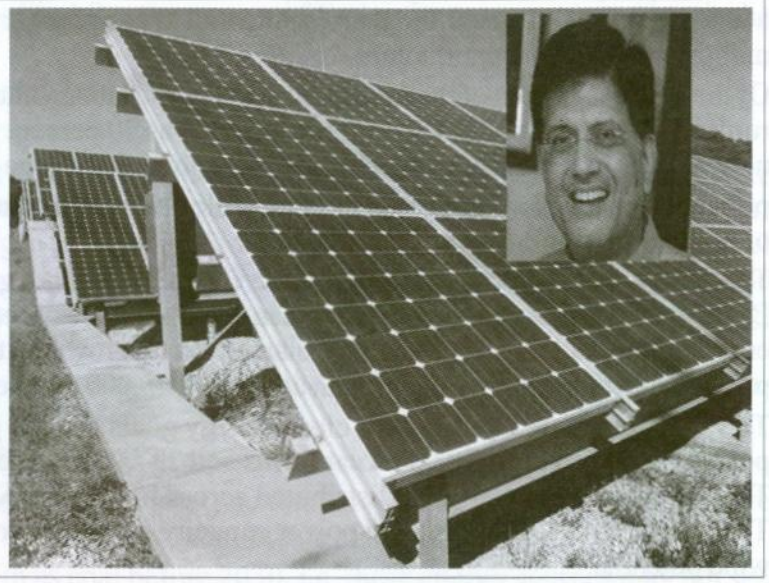
"Clean energy expansion is generating thousands of new jobs while meeting India's climate and economic goals," said **Nehmat Kaur, India Consultant at NRDC**. "With this tremendous opportunity, India is stepping up as a global leader in demonstrating how a growing economy can scale up renewables, generate employment and provide access in the face of rising energy demands." Some 80 per cent of the new workforce is likely to be employed during the construction phase, according to Neeraj Kuldeep, Programme Associate at CEEW.

"However, despite these being contractual jobs, the large pipeline of renewable energy projects creates enough opportunities for workers to stay employed," Kuldeep said.

Solar Power - "Additionally, since most of these jobs are in the rooftop solar PV (photovoltaic) segment, central and state governments must provide greater policy support to the rooftop sector," he added.

(From IANS, in arrangement with indiaclimatedialogue.net.) *Courtesy: The Hindu, dt. 05.07.2017*

INDIAS SOLAR POWER CAPACITY TO BE 22 GW BY MARCH: GOYAL



Indias solar power generation capacity would nearly double to 22 GW by the end of current fiscal and more wind power auctions would be conducted in the coming months, Power Minister **PiyushGoyal** said today. India has set ambitious target of having 100 GW of solar energy and 60 GW of wind power capacities by 2022.

"Solar Power generating capacity would be around 22 GW by the end of this fiscal (from over 12 GW at present)," Goyal told reporters here after releasing a report on integration of renewables in the electricity grid. On wind power, he said: "The auction has already been conducted for 1 GW where tariff has come down to Rs 3.46 per unit (earlier this year). One tender for another 1 GW is also in process, which would be completed soon. The bidding activity would also continue in coming 3-4 months and it would get the same encouragement as in case of solar."

Earlier last month, solar power tariff had dropped to all time low of Rs 2.44 per unit in the auction conducted for Bhadla solar park.

ACME Solar Holdings had emerged as the lowest bidder by quoting Rs 2.44 per unit tariff for 200 MW followed by SBG Cleantech One at Rs 2.45 per unit for 500 MW capacity.

Similarly, the 1 GW wind power auction also evoked good response as the tariff dropped to Rs 3.46 per unit in an auction conducted by the Solar Energy Corp (SECI).

Goyal said: "It is time for the people of India to get ready and embrace the change with a ***New Mindset of a New Grid for a New India***, which is ready to integrate large amount of renewable energy. "The minister had yesterday told reporters after a roundtable with hydro power producers that government will soon bring out a hydro power policy to revive the stalled projects.

Asked about peaking power policy where instead of load shedding, the discoms can supply power at higher tariff than contracted rates during peak hour, the minister had said, "There is no peaking power policy on the unveil. "On stressed power plants of Tata, Adani and Essar that run on imported coal, he had said: "There was a lot of constellation about what would happen to these plants and to the availability of low cost power to some other states. Nothing has come out as yet.

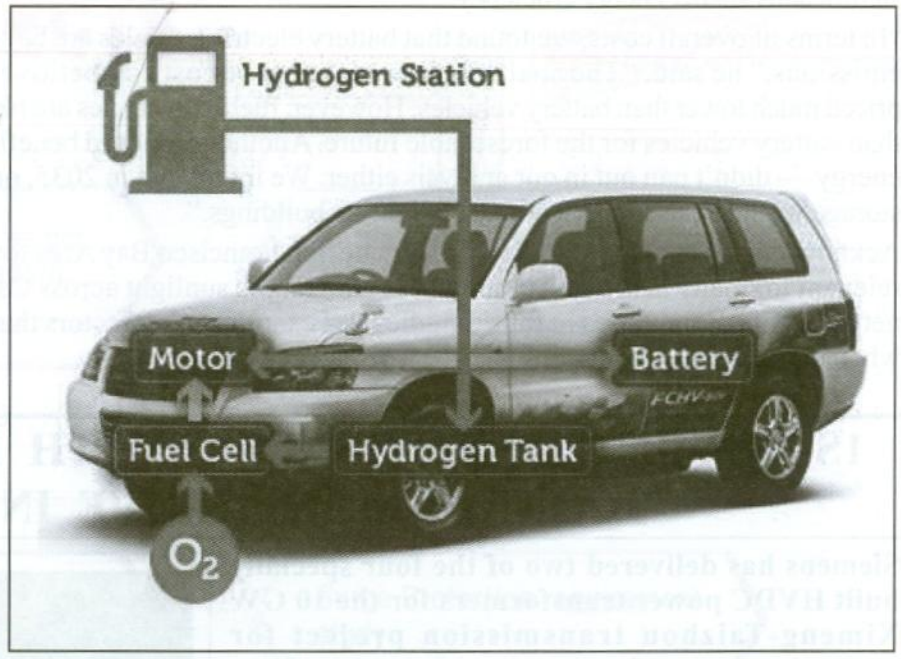
"I had suggested that these imported coal based plants may also look at technical solutions to try to use more domestic coal because under SHAKTI scheme we would soon come out with a policy which will allow import based coal based plant to bid for domestic coal."

There was a buzz that Gujarat government did not want to take over majority stake at these plants being offered to the state at just Re 1, because of political reasons. Gujarat will go for assembly poll by this year-end.

Gujarat UrjaVikas Nigam sources confirmed however that the proposals of these power producers are still under consideration. PTI KKS SA

STUDY IDENTIFIES ELECTRIC CARS AS BETTER CHOICE THAN FUEL CELL VEHICLES

A new study suggests that electric vehicles with rechargeable batteries offer a more affordable way to reduce carbon dioxide emissions than those with fuel cells that convert hydrogen gas into clean electricity.



Published in the November issue of the journal Energy, the study by researchers at Stanford University in the United States and the Technical University of Munich (TUM) in Germany focused on California, where battery electric cars are growing in popularity while only a few manufacturers have begun offering fuel cell vehicles.

The researchers created future scenarios for the town of Los Altos Hills, an affluent community of about 8,000 residents near the Stanford campus. "Los Altos Hills is distinguished by an unusually high solar-generation capacity ... with the highest share of electric vehicles in the state," said lead author Markus Felgenhauer, a doctoral candidate at TUM and former visiting scholar at the Stanford Global Climate and Energy Project (GCEP).

Looking 10 to 20 years into the future, when battery and fuel cell vehicles are expected to be in much wider use, and when solar power and electrolyzers are cost competitive with the electric grid, one of the scenarios for the year 2035 assumed that electric vehicles would constitute 38 percent of the town's vehicle fleet, and that fuel cell vehicles would be powered by locally produced hydrogen made with the cheapest available electricity, be it solar generated or obtained from the grid.

"We provided data on the amount of energy Los Altos Hills needs throughout the day, as well as financial data on the cost of building new energy infrastructures," study co-author Matthew Pellow, a former GCEP postdoctoral scholar now with the Electric Power Research Institute, was quoted as saying in a news release from Stanford. "We included the cost of making solar panels, electrolyzers, batteries and everything else. Then we told the model, given our scenario for 2035, tell us the most economical way to meet the total energy demand of the community."

For what Pellow claimed to be "data-driven analysis," the data about Los Altos Hills was fed to a computational model developed by study co-author Thomas Hamacher, a professor of electrical and computer engineering at TUM.

"We looked at how large-scale adoption of electric vehicles would affect total energy use in a community, for buildings as well as transportation," Felgenhauer said. "We found that investing in all-electric battery vehicles is a more economical choice for reducing carbon dioxide emissions, primarily due to their lower cost and significantly higher energy efficiency."

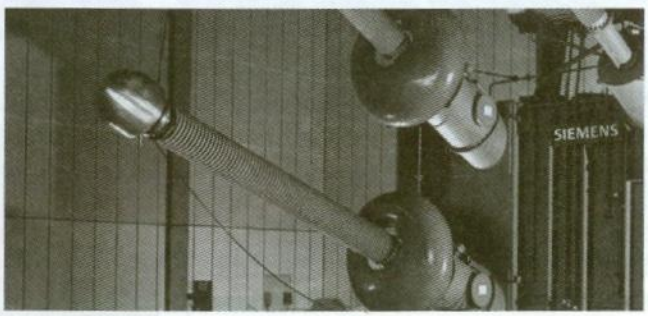
"In terms of overall costs, we found that battery electric vehicles are better than fuel cell vehicles for reducing emissions," he said. "The analysis showed that to be cost competitive, fuel cell vehicles would have to be priced much lower than battery vehicles. However, fuel cell vehicles are likely to be significantly more expensive than battery vehicles for the foreseeable future. Another supposed benefit of hydrogen — storing surplus solar energy — didn't pan out in our analysis either. We found that in 2035, only a small amount of solar hydrogen storage would be used for heating and lighting buildings."

Acknowledging that the study was about one San Francisco Bay Area town, the authors believe the results are relevant for many bedroom communities with ample sunlight across California. They hope to analyze larger networks of communities in future studies and examine other factors that could influence consumers' choices when deciding whether to buy a battery or fuel cell car.

Courtesy: REVE

1ST HVDC TRANSFORMERS WITH 1,050 KV AC GRID CONNECTION ARRIVE IN CHINA

Siemens has delivered two of the four specially built HVDC power transformers for the 10 GW Ximeng-Taizhou transmission project for extracting energy from renewable sources from Inner Mongolia to the province of Shandong.



To meet the demanding requirements of the project, an **exceptionally large transformer** had to be built. In February Siemens successfully tested the **very first 1,050 kV HVDC transformer** for connection to the **800 kV UHVDC grid**, the manufacturer said in a statement.

Two of these units have arrived in Shanghai to support the transmission project, and two more units are in production in the Siemens Factory in Guangzhou.

The manufacturer is also supplying the **key components** of the **transformer** to local partners to ensure the quality of the products manufactured in local factories.

Source: Siemens

ABB DELIVERS DOLWIN2 WIND CONNECTION

ABB has commissioned and handed over the DolWin2 offshore wind transmission link to the Dutch-German transmission system operator TenneT.

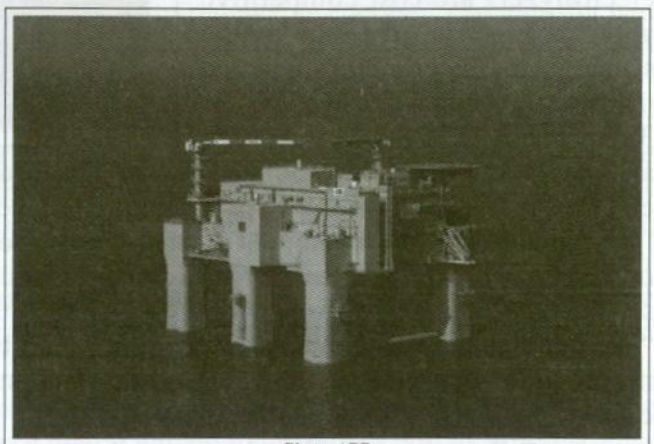


Photo: ABB

The high voltage direct current (HVDC) link includes a 320 kV converter station positioned on a platform about 45 km offshore. The station connects up to three offshore wind farms to the mainland power grid in Germany, according to ABB.

The **916 MW link** has the capacity to supply more than a **million households** with **renewable energy**.

For the manufacturer, the project scope included the design, supply, installation and commissioning of the compact offshore and onshore converter stations as well as the subsea and underground cable systems.

Source: ABB

AMAZON DAMS PLAN IS SET TO COST THE EARTH

Even clean energy could devastate the Amazon, according to new research. A massive increase in hydropower from **a series of planned Amazon dams could harm the world's most important rainforest** all the way from the slopes of the Andes to the Atlantic Ocean.

Photo source: onehdwallpaper.com

Altogether, 428 dams are being built or are under consideration along the network of rivers that drain – and nourish – 6 million square kilometres of forest spanning nine countries. Of these, around 140 are already finished or under construction.

The Amazon is home to four of the world's 10 largest rivers. Of the 34 largest tropical rivers, 20 are in the Amazon region, and these rivers are the source of one fifth of the planet's fresh water.

That same flow delivers the nutrient-rich sediments to habitats downstream to support the teeming life of the region, including the canopy that shelters its shrubs, plants, insects, reptiles, amphibians, mammals and birds.

Professor Latrubesse said. "We have to put the risks on the table and change the way people are looking at the problem. We are massively destroying our natural resources, and time urges us to find some rational alternatives for preservation and sustainable development."

Dams conserve water, deliver irrigation in the dry season, reduce the threat of flooding and of course provide energy for hydropower. On the other hand, they impose an environmental cost: sediments vital downstream are trapped upriver and the floods they might prevent are **an integral part of the forest's long-term stability.**

So dams come at a price not normally measured in economic cost-benefit analyses, but **they can change a river system** and damage an economy all the same.

The researchers first devised what they called a Dam Environmental Vulnerability Index, assessing the vulnerability to land use change, erosion, run-off pollution, trapped sediment and other changes to river systems, to test the real value of the 140 dams already happening and the ones still under consideration.

Many of the dams are in areas that yield heavy loads of sediment: **the Andean Cordillera**, for instance, provides more than 90% of the silt to the entire river system. The Marañon and Ucayali rivers are or will be home to 104 and 47 dams respectively.

Up to 80% of the area upstream of the lowest-planned dam will be vulnerable: dams will change river dynamics, to alter the pattern of creation of oxbow lakes and floodplain sediment storage, putting thousands of species at risk.

The Madeira River drains waters rich in sediments from Bolivia and Peru and has the most diverse fish population. Two huge dams have already led to a 20% fall in sediment concentration in the Madeira, and 25 dams are planned further upstream.

Indivisible

"The Amazon is the most important river basin on the planet. It's a microcosm of our issues of today involving environment, energy and health of the planet," said **Victor Baker, a hydrologist at the University of Arizona**, and one of the authors.

"The river and its individual pieces cannot be separated out. That an individual dam assessment can be separated from the rest of the system isn't scientifically valid."

Amazon River Facts

The Amazon got its name from the brave women warriors of the Greek mythology who were known by the name of Amazons.

The River Amazon in South America is the largest river by discharge of water in the world, and the second in length.

The river originates from the Andes mountains in the Peru.

It runs through Guyana, Ecuador, Venezuela, Bolivia, Brazil, Colombia and Peru.

The length of the Amazon River is approximately 6400 kilometers (4000 miles).

The Amazon is the widest river of the world. The width of the Amazon is between 1.6 and 10 kilometers (1.0 and 6.2 miles) at low stage, but expands during the wet season to 48 kilometers (30 miles) or more.

The mouth of the Amazon is over 320 kilometers (200 miles) wide.

The Amazon discharges 209,000 cubic meters (7,831,000 cubic feet) every second.

The total discharge by Amazon River alone is greater than the total discharge of 7 next largest rivers of world taken together!

The Amazon basin is the largest drainage basin in the world, with an area of approximately 7,050,000 square kilometers (2,720,000 square miles), and accounts for roughly one-fifth of the world's total river flow.

The river is made up of over 1,100 tributaries, 17 of which are longer than 1,600 kilometers (1000 miles).

Marajó, the world's largest river island with an area of 48,000 square kilometers (18,533 square miles) is located on Amazon and is about the size of Switzerland.

The Amazon rainforest is the largest in the world and it surrounds and is supported by the river.

The Amazon River is credited with flowing 20% of the Earth's fresh water into the Atlantic Ocean.

This fresh water brought by Amazon River dilutes the salinity and changes the colour of the ocean's surface. Amazon dumps directly into the turbulent Atlantic. Because of the high tidal energy and the strong waves, sediments from Amazon flow out into the open ocean and thus, Amazon never really forms a true delta.

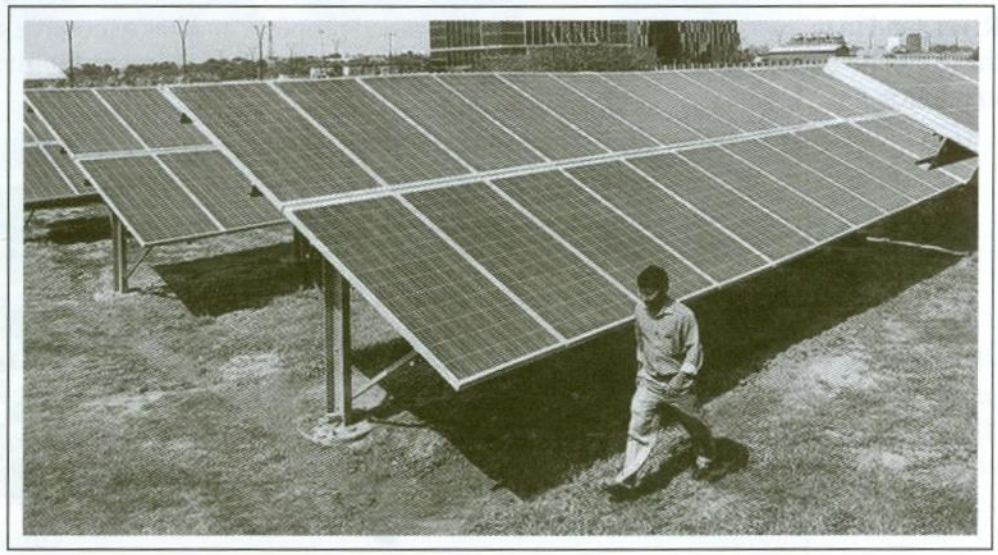
There are over 5,600 known species of fish that live in the Amazon River, with more constantly being discovered.

The river is also known for supporting turtles, snakes, algae and crabs.

The bull shark has been reported 4,000 kilometers (2,500 miles) up the Amazon River at Iquitos in Peru.

Amazon River is the prime habitat of the Boto, which is the largest species of river dolphin and is also known as the Amazon River Dolphin.

SRI LANKA, INDIA TO SET UP SOLAR UNIT SOON



Sri Lanka will soon kick-start the process of setting up a solar power plant in eastern port town Trincomalee after discussions with India, which is partnering the Government in the initiative.

"The next step would be to undertake a feasibility study and do the groundwork," spokesman of the Ministry of Power and Renewable Energy Sulakshana Jayawardena told *The Hindu* on Wednesday.

In April this year, the governments of Sri Lanka and India signed a Memorandum of Understanding, for cooperation in a host of development projects including the setting up of a Liquefied Natural Gas (LNG) plant in suburban Colombo and a solar power plant in Sampur, Trincomalee.

"We have the required land to set up the 50 MW solar plant envisaged in the MoU. We have to now work out the process of executing the project, in consultation with India," Mr. Jayawardena said.

NTPC venture

Sri Lanka had initially planned to set up a coal power plant in Sampur, through an international joint venture with India's National Thermal Power Corporation. However, in September 2016 the Power Ministry scrapped the project citing environmental concerns.

A month later, Prime Minister NarendraModi met President MaithripalaSirisena in Goa, on the side-lines of the BRICS summit, where he flagged the possibility of New Delhi partnering Colombo in LNG and green energy projects.

Sampur, where the solar plant is set to come up, is located in the strategically important port town of Trincomalee, on the north-eastern coast of the island. India and Sri Lanka have agreed to jointly operate a world war-era oil storage facility in the town, with the aim of developing it into a regional petroleum hub.

The proposed solar power plant is in line with SooryaBalaSangramaya (Battle for Solar Energy), an initiative that President Sirisena launched last year to add 220 MW of solar power to Sri Lanka's energy grid by 2020. Currently, the island relies heavily on thermal sources that meet over 70 per cent of the country's energy needs.

Courtesy: The Hindu

USE OF MANUFACTURED SAND IN CONCRETE AND CONSTRUCTION AN ALTERNATE TO RIVER SAND

Introduction

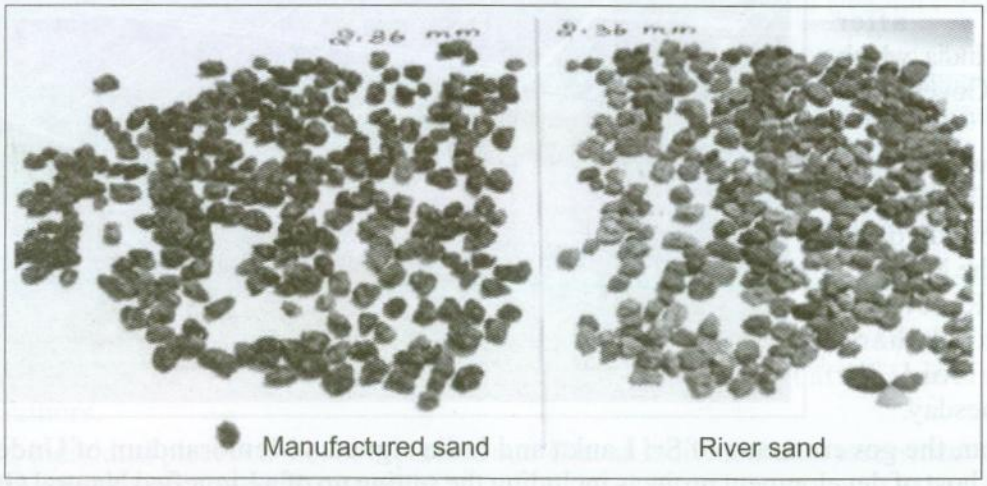
Natural or River sand are weathered and worn out particles of rocks and are of various grades or sizes depending upon the amount of wearing. Now-a-days good sand is not readily available, it is transported from a long distance. Those resources are also exhausting very rapidly. So it is a need of the time to find some substitute to natural river sand.

The artificial sand produced by proper machines can be a better substitute to river sand. The sand must be of proper gradation (it should have particles from 150 microns to 4.75 mm in proper proportion).

When fine particles are in proper proportion, the sand will have fewer voids. The cement quantity required will be less. Such sand will be more economical. Demand for manufactured fine aggregates for making concrete is increasing day by day as river sand cannot meet the rising demand of construction sector. Natural river sand takes millions of years to form and is not repleneshible.

Because of its limited supply, the cost of Natural River sand has sky rocketed and its consistent supply cannot be guaranteed. Under this circumstances use of manufactured sand becomes inevitable.

River sand in many parts of the country is not graded properly and has excessive silt and organic impurities and these can be detrimental to durability of steel in concrete whereas manufactured sand has no silt or organic impurities.



However, many people in India have doubts about quality of concrete / mortars when manufactured or artificial sand are used. Manufactured sand have been regularly used to make quality concrete for decades in India and abroad.

Pune - Mumbai expressway was completely built using artificial/manufactured sand.

Issues with Manufactured Sand

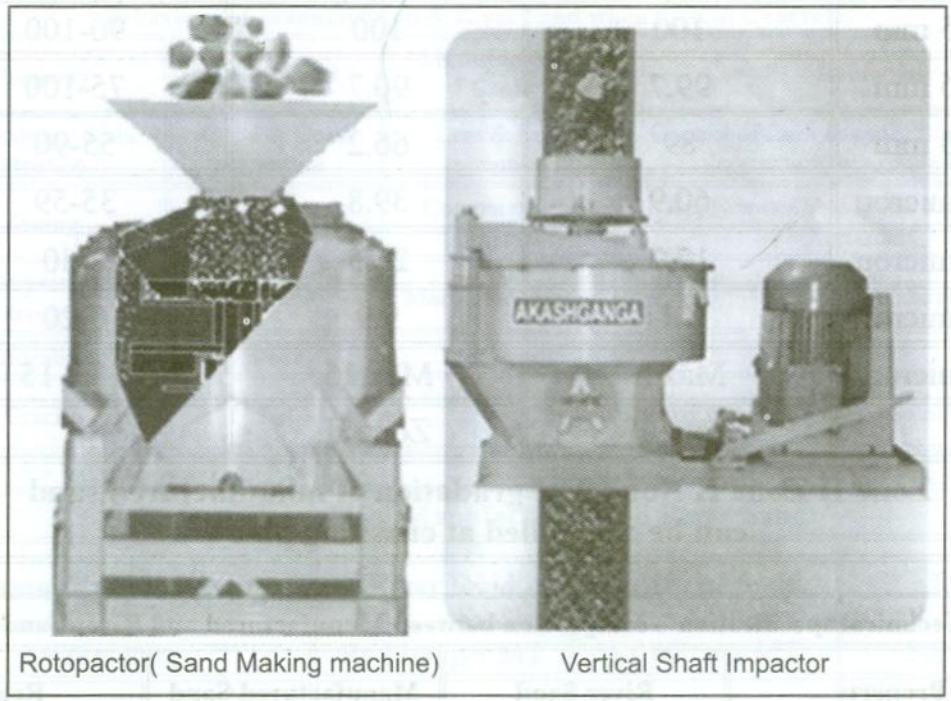
- The Civil engineers, Architects, Builders, and Contractors agree that the river sand, which is available today, is deficient in many respect. It does content very high silt fine particles (as in case of Filter sand).
- Presence of other impurities such as coal, bones, shells, mica and silt etc makes it inferior for the use in cement concrete. The decay of these materials, due to weathering effect, shortens the life of the concrete.
- Now-a-days, the Government have put ban on lifting sand from River bed.
- Transportation of sand damages the roads.
- Removing sand from river bed impact the environment, as water table goes deeper & ultimately dry.

General Requirements of Manufactured Sand

- All the sand particles should have higher crushing strength.
- The surface texture of the particles should be smooth.
- The edges of the particles should be grounded.

- The ratio of fines below 600 microns in sand should not be less than 30%.
- There should not be any organic impurities
- Silt in sand should not be more than 2%, for crushed sand.
- In manufactured sand the permissible limit of fines below 75 microns shall not exceed 15%.

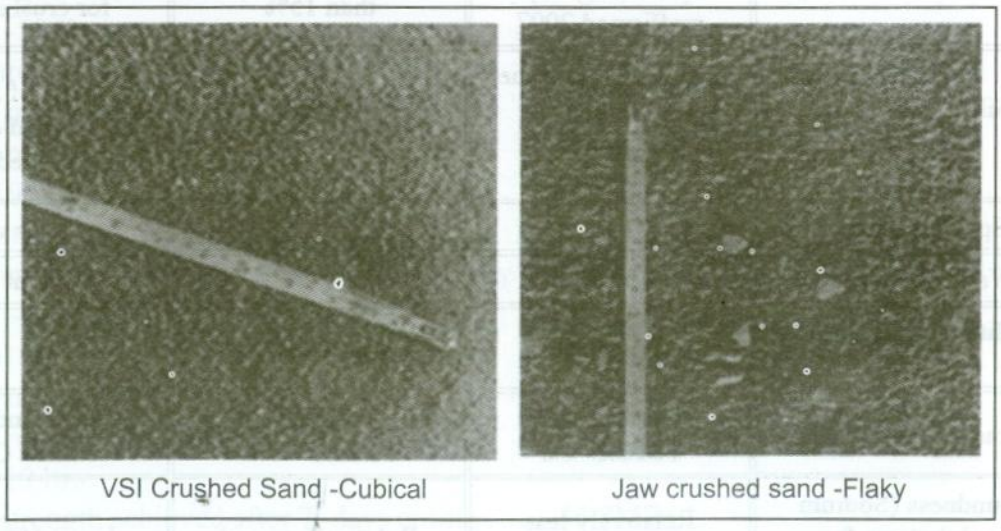
Crushing, Screening, and Washing



Rotopactor(Sand Making machine) Vertical Shaft Impactor

Manufacturing of Sand process involves three stages, crushing of stones in to aggregates by VSI, then fed to Rotopactor to crush aggregates into sand to required grain sizes (as fines). Screening is done to eliminate dust particles and Washing of sand eliminates very fine particles present within. The end product will satisfy all the requirements of IS:383 and can be used in Concrete & construction. The VSI Plants are available capacity up-to 400Ton Per Hour (TPH).

Manufactured Sand (M Sand)



VSI Crushed Sand -Cubical Jaw crushed sand -Flaky

Only, sand manufactured by VSI crusher/Rotopactor is cubical and angular in shape. Sand made by other types of machines is flaky, which is troublesome in working. The Jaw crushers, are generally used for crushing stones in to metal/aggregates. Manufactured sand from jaw crusher, cone crusher, roll crusher often contain higher percentage of dust and have flaky particle.

Typical Sieve analysis: Comparison of River & Manufactured Sand			
IS Sieve	% of passing (River Sand)	% of passing (Manufactured Sand)	Zone II (As per IS:383)
4.75 mm	100	100	90-100
2.36 mm	99.7	90.7	75-100
1.18 mm	89	66.2	55-90
600 micron	60.9	39.8	35-59
300 micron	17.7	25.5	8-30
150 micron	3.1	9.9	0-20
75 micron	Max 3	Max 15	Max 15
	Zone II	Zone II	
Zone II Zone II Note: The gradation of manufactured sand can be controlled at crushing plant			

Technical specification – comparison between Manufactured and River Sand				
Sl No	**Property**	**River Sand**	**Manufactured Sand**	**Remarks**
1	Shape	Spherical particle	Cubical particle	Good
2	Gradation	Cannot be controlled	Can be controlled	
3	Particle passing 75 micron	Presence of silt shall be less than 3% (IS:383-1970) reaffirmed 2007	Presence of dust particle shall be less than 15%	Limit 3% for uncrushed & limit 15% for crushed sand
4	Silt and Organic impurities	Present (Retard the setting & Compressive Strength)	Absent	Limit of 5% for Uncrushed & 2% for Crushed sand
5	Specific gravity	2.3 - 2.7	2.5 – 2.9	May vary
6	Water absorption	1.5 - 3%	2 – 4%	Limit 2%
7	Ability to hold surface moisture	Up-to 7%	Up-to 10%	
8	Grading zone (FM)	Zone II and III FM 2.2 -2.8	Zone II FM 2.6 – 3.0	Recommends Zone II for Mass Concrete
9	Soundness (Sodium sulphate-ss & Magnesium sulphate -ms) (5 cycles)	Relatively less sound (Ex. >5)	Relatively sound (Ex. <5)	Limit 10% ss and 15% ms
10	Alkali Silica Reactivity	0.002 -0.01	0.001- 0.008	Limit 0.1% expansion

IS Code Provisions

BIS Guidelines IS: 383-1970 for selection and testing of Coarse and Fine aggregates available. Generally, Sand is classified as Zone I, Zone II, Zone III and Zone IV (i.e. Coarser to Finer). There is sieve designation for each zone. Gradation is made in accord with the usage of the sand. There are testing sieves, consists of 4.75mm, 2.36mm, 1.183mm, 600microns, 300 microns, 150 microns and a pan.

Behaviour of Manufactured & River Sand when used in Concrete:				
Sl No	Property	River Sand	Manufactured Sand	Remedies
1	Workability & its retention	Good & Good retention	Less & Less retention	Control of fines & apply water absorption correction, use of plasticisers
2	Setting	Normal	Comparatively faster	Apply water absorption correction, use retarders
3	Compressive strength	Normal	Marginally higher	As shown above
4	Permeability	Poor	Very poor	
5	Cracks	Nil	Tend to surface crack	Early curing & protection of fresh concrete

Cost comparison of Manufactured and River Sand:				
Sl No	Location- Bangalore City	River Sand	Artificial Sand	Remarks
1	Market Rate	Rs 1100 per MT	Rs 600 per MT	50% Cheaper
2	In Concrete - Rs per Cum	Rs 770 – 880	Rs 420 – 480	Saving of Rs 350-400 per cum
3	In Mortar (1:5) for 100 Kgs	Rs 198	Rs 156	20% less

Typical Compressive Strength of Concrete: The following results show the behaviour of manufactured sand and riverbed sand when used in concrete:

- With using Riverbed Sand: (All proportions are by weight)
- Cement -50 Kg
- River Sand -75 Kg
- Agg. 20 mm- 75 Kg
- Agg. 12 mm -37.5 Kg
- Water -19 ltrs

Compressive strength achieved after 7 - days curing 44.1MPa

- With using Artificial Sand : (All proportion are by weight)
- Cement – 50 Kg
- Artificial Sand – 70 Kg
- Agg. 20 mm – 80 Kg
- Agg. 12 mm – 35 Kg
- Water – 19 ltrs

Compressive strength achieved after 7 -days curing 46.8MPa

Vastu Aspects of River sand

Now-a-days, Vastu Shastra is more popular, consults Vastu by many people while constructing a house. As per Vastu Shastra, the building material must be free from traces of human or animal body. The river sand contains bones of human beings and animals. The shells are also a kind of bone. It is not easy to take out all

such things present in the river sand. Hence, the best solution for this is to use artificial/crushed sand of good quality for human well being.

Environmental Impact

The River sand lifting from river bed, impact the environment in many ways:

- Due to digging of the sand from river bed reduces the water head, so less percolation of rain water in ground, which result in lower ground water level.
- The roots of the tree may not be able to get water.
- The rainwater flowing in the river contents more impurities.
- Erosion of nearby land due to excess sand lifting
- Disturbance due to digging for sand & lifting, Destroys the flora & fauna in surrounding areas
- The connecting village roads will get badly damaged due to over- loading of trucks, hence, roads become problem to road users and also become accidents prone
- Diminishing of Natural Rivers or river beds, not available for future generations.

Conclusion

- Considering, the acute shortage of river sand, huge short coming on quality of river sand, high cost, greater impact on road damages and environmental effects, The Construction Industry shall start using the manufactured sand to full extent as alternative, reduce the impacts on environment by not using the river sand.
- The Local Authorities/PWD/ Govt, shall encourage the use of Manufactured sand in Public Construction Works, if possible, shall make mandatory to use Manufactured sand wherever available with immediate effect.
- The Govt. Shall come out with, Policy on Sand – encourage the industry people to set up more no. of Sand crushing Units across the all Districts, States to meet the sand requirements of the Construction Industry.

Source: http://www.nbmcw.com/concrete/28675-use-of-manufactured-sand-in-concrete-and-construction-an-alternate-to-river-sand.html

G Sreenivasa, *General Manager (Business Development), UltraTech Cement Limited Bangalore*

WHAT DOES YOUR SMART METER KNOW ABOUT YOU? – FUTURE CHALLENGES

An ordinary smart meter gives your local utility useful information about how much energy you are using—every hour, or even as often as every minute. This helps utility planners efficiently adjust electricity generation to meet demand or encourage reductions in demand when necessary.

But machine learning systems, looking at that data, can tell something else about your home besides its energy use—they can tell if you are home, or if you are not. That's what University of California at Berkeley researchers Ming Jin, RuoxiJia, and Costas Spanos found out. That information, Jin says, is also useful for utilities—they can call or show up to perform necessary maintenance when you are home, and not waste personnel time trying to reach you.

But they aren't the only ones who can access this information, given the data is transmitted wirelessly, and isn't necessarily encrypted at every stage of **its journey**.

"If you know a person is home, as an advertiser, you can make a phone call. If you know a person isn't home, that information could be used for home intrusion or other bad activities," Jin says.

In a **recent paper**, Jin and his colleagues demonstrated that machine learning systems can be trained to detect occupancy without any initial information from a home owner. "You just need a smart meter that listens over time," he says, "as well as the basic assumption that different types of buildings have different occupancy patterns, for example, commercial buildings are typically occupied during the day and not the night and homes are the opposite." Using this assumption, the machine learning algorithms were able to tease out more detailed characteristics about power consumption when a home is occupied; they then are able to tell when someone is home or not, even when that person's patterns are outside the norm.

How to keep occupancy data private and still provide the information utilities need to manage their grids is the next area of research, Jin says. "Right now, meters are sending accurate information about energy consumption. To protect privacy, you could add some noise to that data. We are now looking to determine the optimal size of the added noise that would mask information about occupancy and still give the utility company an accurate enough reading for its needs."

ACME HAS PROVIDED ECOCHARGE BATTERY SWAPPING & CHARGING STATIONS TO OLA FOR THEIR PILOT PROJECT AT NAGPUR CITY

ACME has announced the launch of EcoCharge, country's 1st Battery Swapping & Charging Station for the Electric Vehicles. The EcoCharge Battery Swapping & Charging Station comes with the following advantages:

- Lowest Operating Cost
- Fast Charging
- Swapping time less than filling Fuel
- Longer Life
- Build, Own & Operate Model
- ICAT/ARAI Approved Lithium Batteries
- Option for Battery to Grid (B to G)

ACME has provided EcoCharge Battery Swapping & Charging Stations to Ola for their Pilot Project at Nagpur City in which 200 vehicles including bus, auto and car— all running on electricity was launched in the first stage on May 26, 2017. This Project was flagged off by **NitinGadkari**, Union Minister for Road Transport, Shipping and Roadways. ACME in a statement said that we have setup battery Swapping & Charging Stations with Lithium Batteries for electric vehicle at multiple locations in Nagpur. We plan to replicate similar swapping and charging infrastructure in other cities of India to facilitate adoption of electric mobility.

"*We are honoured to participate in this project with OLA which is a great example of the Make in India initiative. Our solution delivers performance needed for anxiety free transport at lowest cost which a common man can afford and at the same time it helps environment to be pollution free*" said **Manoj Kumar Upadhyay, Founder & Chairman, ACME Group**.

The company said we have demonstrated that Energy storage solutions integrated with solar can be very effective in managing electricity demand. We strongly advocate that Energy Storage Solutions along-with Solar would be a game changer in times to come. Our vision is to develop and adopt technologies which help humanity to move from scarcity to plenty. We believe that every segment of the social sector should get access to sustainable & affordable energy and transportation while protecting our environment added ACME.

ACME offers Lithium Batteries with in-house developed intelligent BMS technology for electric mobility & stationary applications ranging from KWh to MWh. ACME has a State-of-the-Art Lithium Battery Manufacturing Facility at Rudrapur, Uttarakhand which is spread over an area of 28 Acres. ACME is also working on various R&D projects on storage technologies.

Upadhyay further added, "*I see a future of energy storage along-with solar to provide 24×7 power and oil-free transportation. This should help India to solve many problems like reducing pollution, reducing oil import and will enable many industries to come up and increase employment. We thank Government for starting to put a similar level of focus on energy storage solutions like they did in Solar Mission.*"

The ACME Group is a leader in the field of energy management and innovative solutions for the wireless telecommunications and alternate energy sector. It prides itself as a pioneer in the development of green technology solutions that are environment friendly, energy efficient, & cost effective and also capable of delivering a quick return on investment.

About ACME :

ACME Group is a result of the vision and commitment of its founder, **Mr. Manoj Kumar Upadhyay**. He sought to realize this goal by providing radically new technology solutions through intensive research and development instead of making incremental changes to existing technologies. The establishment of ACME Cleantech Solutions Pvt. Ltd. (formerly ACME Tele Power Limited) in 2003 was the first step towards realization of this dream.

Today ACME products are installed over 1,50,000 telecom sites across the globe. ACME products help significant Carbon Emission Savings.

AMAZON INSTALLING ROOFTOP SOLAR POWER ON ITS WAREHOUSES

Rooftop solar power at Amazon fulfillment center in Patterson

Amazon has begun installing rooftop solar power atop its warehouses with the intention of completing at least 50 such installations by 2020.

The online retail giant **says that** by the end of 2017, rooftop solar power systems on 15 of its American fulfillment and sortation centers – in California, Delaware, New Jersey, Maryland, and Nevada – will be generating up to 41 megawatts (MW) of power.

Amazon expects to generate as much as 80 percent of the annual power used in a warehouse from solar energy, although this will vary from installation to installation.

Amazon will 'pass along further savings to customers' - Rooftop solar power systems are already installed at the company's fulfillment center in Patterson, CA where solar panels cover more than three quarters of the roof of the 1.1 million square foot building. The solar energy powers hundreds of the Amazon robots operated by staff inside the warehouse.

"As our fulfillment network continues to expand," says Dave Clark, Senior Vice President of Worldwide Operations, "we want to help generate more renewable energy at both existing and new facilities around the world in partnership with community and business leaders."

"By diversifying our energy portfolio, we can keep business costs low and pass along further savings to customers," he adds.

One of several renewable energy projects - The rooftop solar power initiative is one of several renewable energy projects that Amazon is pursuing. In Texas, for example, the company has **recently installed** its largest wind farm – the 253 MW installation is expected to generate 1 million megawatt hours (MWh) of wind energy annually.

There are also wind and solar farms in Indiana, North Carolina, Ohio, and Virginia, that provide power to Amazon Web Services (AWS) datacenters.

AWS have declared a long-term aim of achieving 100 percent renewable energy usage for their global infrastructure footprint. They are on track to reach the 50 percent mark by the end of 2017.

Adding the recent announcement to the list of projects planned or in construction will bring the total amount of renewable energy AWS will be generating to 3.6 million megawatts.

Other sustainability-focused projects Amazon is undertaking include green rooftops and using recycled energy for heating its headquarter offices in Seattle.

In a **recent report** by GreenBiz Group, Amazon was found to be the leading corporate buyer of renewable energy in the US in 2016.

1 in 50 new jobs in the US is in the solar power industry - Amazon is also supporting career development for its staff who wish to become **NABCEP** certified installers of photovoltaic (PV) solar panel systems for commercial and residential properties.

The renewable industry is growing quickly and many workers who qualify as PV installers may rapidly find themselves rising to management positions, or being sought as designers or developers of renewable energy systems all over the world.

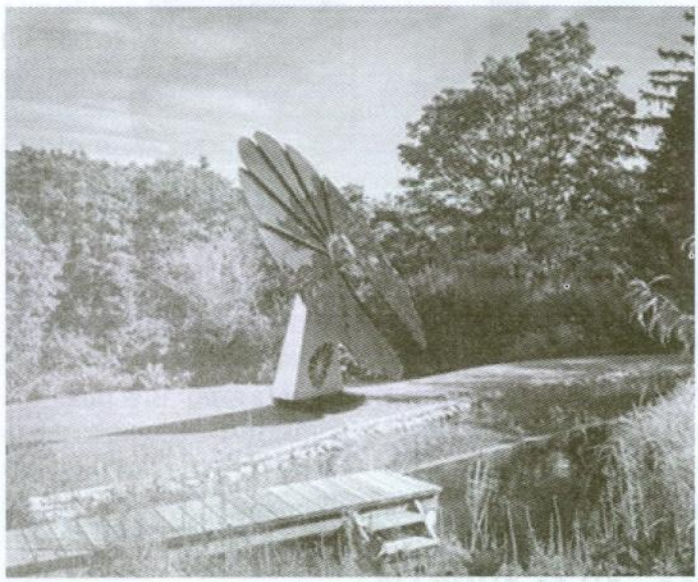
In the US for example, one in 50 jobs created last year was in the solar power industry, according to the Solar Foundation's **Solar Jobs Census 2016.**

SOLAR POWERED SMART FLOWERS ARE NEW FOCUS FOR CAPE WIND CHAMPION JIM GORDON

Pioneer of offshore wind in the U.S. Jim Gordon takes financial stake in Austrian SmartFlower technology.

By Jennifer Runyon , Chief Editor. July 15, 2016

An innovative solar plus storage solution that was launched in Europe about 2.5 years ago is coming to the U.S. The product is called **"SmartFlower"** and it looks like a gigantic sunflower with a short, fat stalk. The company said it has sold about 1000 units into 20 different European countries since launch.

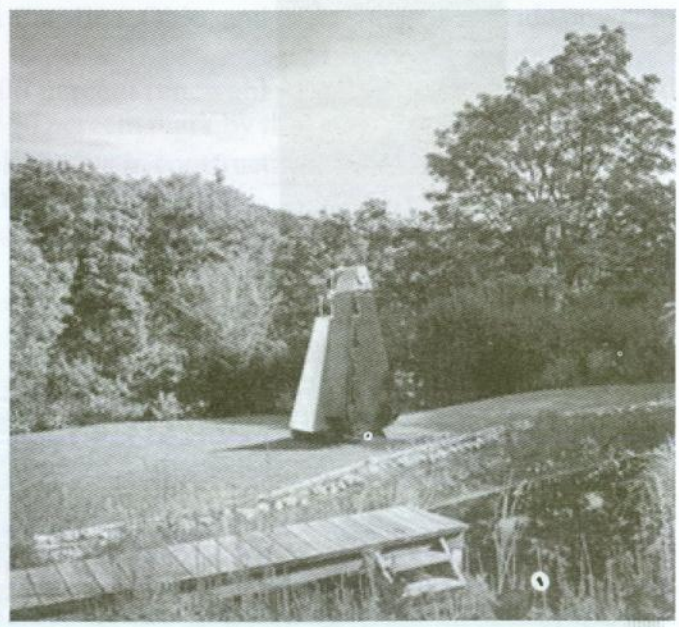


The SmartFlower wakes up at sunrise, fans out its solar panels to 194 ft² and automatically cleans itself in preparation for capturing the sun's rays. SmartFlower then turns to face the sun at a 90°angle, and follows the sun throughout the day using dual-axis tracking to maximize solar energy yield. One SmartFlower produces the equivalent of a 4 kW rooftop system, according to the company.

Energy harvested during the day is stored in the lithium-iron-phosphate (LiFePO4 or LFP) batteries and managed through a **"smart"** energy management system that helps the homeowner decide when to use power from grid, the battery or the solar panels. The company is working on more smart features that that, for example, might enable the system to decide what to do if there is too much power — perhaps suggesting the homeowner turn on the air conditioner or the pool pump.

Founder and managing partner Alexander Swatek *explained that the panels are high-efficient monocrystalline cells and are also produced in Austria* (as is the rest of the product).

"We use a very special technology of 2mm hardened glass, which you can bend in any direction and it doesn't crack, which is very important for outdoor usage," he said.



From Utility-Scale Wind to Residential Solar

While the product itself is quite interesting and has won numerous design awards including the **Red Dot 2016 Award** and the **Green Good Design Award for 2016**, what's also interesting is that the man who is passionately fighting to keep offshore wind project Cape Wind viable, is behind the company's move to North America.

Jim Gordon has been trying to get his 130-MW offshore wind farm built off the coast of Massachusetts since 2001 and has successfully defeated 26 lawsuits against the project all filed by citizen groups who don't like the aesthetics of the project. The Koch brothers have supported the opposition. In 2015 the project lost its

PPAs because it had not begun construction and just the week, the project suffered another loss as the federal appeals court threw out two of the government approvals for the project.

Gordon remains hopeful that Cape Wind will one day come to fruition but for now he's throwing his passion for clean energy toward the SmartFlower.

"I saw this on the internet about 3 months ago and the next day I hopped on a plane to Vienna, Austria," he said. "The very next day."

Gordon wrangled a meeting with founder Swatek and insisted that he become an investor and bring the product to the North American market.

"I like to be on the leading edge," said Gordon, adding: "For so many years I've been dealing with environmental regulators and bureaucrats and NIMBYs (not in my backyard). I want to leapfrog over all of that and I want to empower the individual."

The Smart Flower puts clean energy in the hands of the homeowner, business, or municipality. "It's in your hands to make a decision," said Gordon.

"A billion and a half kilowatts of clean power have been kept from the public because of Bill Koch and his cronies. All I have to do is sell 350,000 of these to make up that billion and a half kilowatts," he said.

With a price tag of US $16,900, the product's price point is right in line with a typical 4-kW system in most parts of the U.S. Plus, it comes in eight color choices and takes just a few hours to install said the company.

The SmartFlower was on display at Intersolar North America in San Francisco from July 12-14 and is considering exhibiting at Solar Power International in September.

DUBAI MUNICIPALITY LAUNCHES SMART FLOWER SOLAR PANEL

DUBAI // A flower-shaped solar panel that can reorient itself to face sunlight has been announced by Dubai Municipality.

The Smart Flower was developed by an Austrian company and contains sensors allowing it to automatically track rays of sunlight, the municipality said on Wednesday.

This feature makes it 23 per cent more efficient than traditional roof-top solar systems.

The device has a weather-adapting feature and a passive ventilation system to ensure it is efficient in high temperatures.

Hussain Nasser Lootah, director general of the municipality, said the Smart Flower is in line with the vision of Sheikh Mohammed bin Rashid, Vice President and Ruler of Dubai.

"Dubai Municipality's commitment to innovation and implementation of creative ideas in line with Dubai Government's vision of becoming the world's most innovative and sustainable city," said Mr Lootah.

The Smart Flower is one of several initiatives started by the municipality's sustainability and renewable energy department, said Khalid Al Awadhi, assistant director general for the municipality's environment, health and safety control sector.

Another project was the Dubai Lamp, which he said was the world's most efficient LED lamp available commercially. It is expected to reduce energy consumption by 90 per cent.

ENERGY CONSERVATION THROUGH ENERGY EFFICIENCY – 28

EMDS: Electric Motor Driven Systems - The details from International studies and analysis are continued in the components, controls and major driven equipments efficiencies and energy consumption.

Efficiency opportunities in different motor applications

Most electric motor applications use the rotational speed and torque of a motor shaft to drive a piece of equipment. The components can be integrated (or packaged) in one unit or separated and mounted on the same base.

Pumps

Pumps are used for the transport of fluids (mostly water, drinking water, sewage, but also oil etc.) in open and closed loop systems. Pumps are available in integrated sets (size <2 kW) and separately with motors and pump wheels, which are assembled at the place of application.

General applications for pumps include:

- **Building technology:** pumps for drinking water, boilers, heating and cooling, sewage pumps and fire water pumps.
- **Infrastructure:** pipelines for oil, urban distribution of drinking water and sewage, district heating and cooling.
- **Industry:** clean and sewage water systems, process fluid pumps (oil, chocolate, etc.), and hydraulic pump systems.

The efficiency of pumps varies with size (flow, diameter, power) and type of fluid. A major impact is the operation point versus the optimal point. Constant flow systems can be sized close to the maximum efficiency point. In most applications with variable load, the pump has to work with changing flow and pressure, and therefore moves away from optimal efficiency.

Fans

Fans are used for transport of gas (mostly air) in industrial, commercial and residential applications in open loop and closed loop systems. Fans are sold in integrated systems as fan sets (up to 2 kW) and separately in motor plus fan wheels that are assembled on site only.

General applications for fans are:

- **Building technology:** ventilation fans for supply, exhaust and air recirculation, air supply and in combination with heating, cooling, humidifying and dehumidifying systems.
- **Industry:** blowers for heating, cooling and drying and clean room ventilation.
- **Traffic:** tunnel ventilation.

The efficiency of fans varies with size (flow, diameter, power) and type of gas. A major impact is the operation point versus the optimal point. Constant flow systems can be sized close to the maximum efficiency point. In most applications with variable load, the fan has to work with changing flow and pressure and moves away from its optimal efficiency. Only large fans with adjustable blades (tunnel ventilation) can avoid this.

Compressors

Compressors are used in the following three electric motor system applications: air compressors for compressed air, liquid natural gas, gas transport, etc.; cooling compressors; and heat pumps.

Their application is predominantly in the following sectors:

- **Appliances:** refrigerators and freezers for commercial and domestic use generally fully enclosed cooling compressors with <0.2 kW.
- **Building technology:** cooling machines for central air conditioning (0.5 kW to 500 kW and more); room air conditioners (0.2 kW to 5 kW); pneumatic systems for motion control.
- **Industry:** process cooling systems with temperature ranges from ambient temperature down to –30°C (food industry) and more; compressed air systems for material handling.

Compressor technology uses reciprocating, rotary screw and centrifugal systems. Most compressors come in packaged systems in which the motor and the compressor are in a full or semi hermetic enclosure. Many compressor systems run in an efficiency range of only 5% to 10%.

Many compressed air and pneumatic control systems can be replaced by more efficient systems such as electric servo or linear motors. Very large international companies design, manufacture and sell large volumes of standard compressor packages, and this industry is moving very slowly to introduce new and advanced energy efficient compressor systems. EE motors and VFDs are very powerful ways of making both cooling and compressed air systems run more smoothly and efficiently.

Other applications

Industrial and commercial use of electric motors falls into several categories:

- **Transport of goods and people**:
  - Vertical (elevators), sloped (conveyors), horizontal (walkways etc.)
  - Cranes and hoists
  - Robotics for assembly
- **Material processing:**
  - Mixers, crushers, cylinder rollers, injection molding, extruding, etc.
  - Temperature treatment (in combination with resistance heating, fossil heat and cooling system)

The motors used in the applications above are often part of larger production machines that are a combination of many motors and drives, and also have thermal treatment installed. The energy used by such motors is only significant when they run continuously or have frequent intermittent operation characteristics that amount to >1 000 hours per year of operation and more.

Related energy#avings opportunities

Engineering practice improvement

An electric motor converts grid electricity into mechanical power, usually in the form of a shaft delivering torque at a defined rotational speed to an application machine. The electric motor is correctly described in terms of physics as a converter of electrical into mechanical energy. The energy consumed by the motor represents the losses inherent in the motor and other mechanical and electrical components while delivering a 100% mechanical output. The main focus of engineering practice improvement is the reduction of losses in EDMS, but within this definition the 100% net mechanical energy used must also be scrutinized for sub optimal applications and operation without any use and in idle conditions.

The major element for improving electric motor system efficiency is better engineering practices in the following areas:

- Life cycle cost: consider avoiding minimal first cost, decisions on repair versus replacement.
- Integrated machine design: OEMs tend to focus on production at low initial cost rather than efficiency.
- Packaged products: component integration to avoid the addition of maximized separate elements.
- Adequate sizing: calculated safety factors to avoid general over sizing practice.
- Efficient operation: factory automation systems with precise on/off and partial load controls to avoid hours of operation without any use.

The largest benefit in energy efficiency improvement comes from a systematic integration and optimization of all mechanical and electrical components in a total motor system. Four major areas are involved (Table in the next page). Motor system efficiency can be improved from around 40% to 65% or the total required grid peak load can be reduced from 240% to 160% of the net mechanical load. The improvement results from several individual and consecutive improvement steps.

Designing the total motor system (the entire application from supply grid to output product) is a complex task. To achieve cost effective installations and machines that operate safely and reliably, the engineering approach must set high targets for energy efficiency and apply an integrated design model. It is important to question production demands (capacity, speed, and environment) before selecting technical components.

Areas of energy efficiency in electric motor systems

Table

Sl. No.		Involved equipment	Improvement possibilities
1.	Electric input and conversion	Factory automation	Efficient low-voltage supply, low energy mode during standstill
		Transformation	Use efficient transformers
		Power factor compensation	Use motors with high power factor and use efficient power compensation
		Voltage 3 phases	Balanced voltage
		VFD	Properly sized, programmed and efficient VFD, use active end VFD
		Motor	Efficient, properly sized motor
2.	Mechanical transformation	Throttle, damper	Avoid mechanical load management
		Clutch	Try direct drive, avoid worm gear
		Gear	Use Efficient gearboxes
		Valves	Use fully open valves with wide gauge
		Transmission	Try direct drive, avoid V-belts and chains, use flat of synchronous belts
		Brake	Use efficient brake, try active braking
3.	Application	Low volume	Avoid unnecessary high flow volume and mass
		Low Speed	Avoid unnecessary high speed, increase pipe and duct size
		Low pressure	Avoid unnecessary pressure due to bends, use full size heat exchangers, valves, filters, etc.
4.	Operation and maintenance	Shorter time	Avoid unnecessary operation time without use: factory automation with automatic load control/off
		No idle time	Avoid idle time: automatic load control/off
		Maintenance	Use regular maintenance for motor and mechanical components
		Rewinding	If not replacement: try quality rewinding
		Replacement	Preventive maintenance and planned replacement
		Metering	Install and use system operation metering

Abbreviation: VFD = variable-frequency-drive.

(To be continued)

S. Mahadevan, B.E., F.I.E., M.B.A.,
Consultant,
Energy and Energy Efficiency,
Mobile: 98401 55209

MODI GOVERNMENT PLANS MAJOR POLICY PUSH TO PROMOTE E-VEHICLES

India will soon embark on an ambitious programme aimed at switching most, if not all, of its vehicles to battery power by 2030. In an audacious move worthy of Elon Musk, the key to the plan's success will be the eschewing of subsidies driven by a battery leasing strategy. The scheme, which kicks off in the next few months, includes limited tax breaks for manufacturers and the sale of vehicles without batteries to improve affordability, said a senior government official with knowledge of the plan.

The strategy is in marked contrast to the approach of most countries including the US, Japan and China, which have earmarked billions of dollars in subsidies for electric vehicles and have advised India against schemes that aren't funded this way. India, however, is forging ahead with its contrarian strategy that will start with public transport in the first phase, said the official cited above. ***Indian Institute of Technology-Madras professor Ashok Jhunjhunwala*** will spearhead the programme, he said.

While Indian manufacturers are keen on being part of the initiative, most of the overseas ones favour hybrid technology, said the official cited above.

Two-wheelers, three-wheelers and non-air-conditioned city buses made by automobile companies in India will be sold without batteries as part of the plan, thus slashing prices by as much as 70%. The batteries will be leased at a specified cost and can be swiftly swapped with recharged ones at stations, he said. "The private vehicles will be the last lap of the scheme. We expect the programme to start scaling in three years. The programme is in the final stages of drafting," the official said

"It will take just two-and-half minutes to replace auto batteries and can be done in 10 minutes when city buses rest after about a 30-km trip. The model, however, will not work for AC cars and AC buses," the government official said.

Vehicle manufacturers expect the fine print of the policy to be made public soon. "An inter-ministerial committee led by NitiAayog is drawing up the details of the plan to promote usage and convert most vehicles to electric by 2030," said a senior auto industry executive. "We expect a formal policy in about six months. A lot of effort and thought have to be given to how to put an infrastructure for such schemes in place. Also, while we move towards this goal, the government should not cast aside technologies such as hybrid which are stepping stones to going electric."

The ministries of road transport, power, petroleum and heavy industries are involved in the programme being framed by the government, he said.

For taxis, the government is considering fast-charging electric stations. Specifications and guidelines for each type of electric vehicle, lease plans, battery swaps and charging stations are being worked out.

The government sees a clear cost advantage in shifting to electric. If battery and vehicle are paid for, a sedan powered by an internal combustion engine costs Rs 7 per km to run, as opposed to **Rs 1 per km for an equivalent electrical vehicle**.

ROPING IN AGGREGATORS

The government is considering involving aggregators to club demand and vehicle leases, the official said. The government has held fruitful discussions with stakeholders including manufacturers of vehicles, batteries and components as well as aggregators, he said. Aggregators will purchase vehicles and lease them to drivers.

The tax breaks for manufacturers are expected to give the **'Make in India'** programme a boost. "In the pilot phase, cells for the batteries will be imported. As the programme scales up, they can be manufactured locally," said the official. The transition to electric from hydrocarbons will happen organically as prices become comparable, the official said.

Petrol and diesel vehicles have more than 2,000 moving parts as opposed to about 20 in electric vehicles, making them 90% energy efficient against 20% for the first kind, according to the official cited above. Only 1% of the 200 million vehicles on Indian roads currently are estimated to be electric vehicles.

To be sure, there are questions the government has to address, experts and executives said. Bharat Stage-VI emission norms will come into effect by 2020, requiring heavy investments by automobile companies. Will they be willing to spend this money if the ecosystem is about to get transformed. Also, what happens to oil refineries? A bulk of their output goes to fuel vehicles.

ABB has supplied electric vehicle charging solutions to car and bus original equipment manufacturers in India. ABB India also has an R&D cooperation pact with the Centre for Battery Engineering at IIT-Madras.

Interestingly, ChetanMaini, India's electric car pioneer, has moved onto a new venture after selling his business to Mahindra & Mahindra — giving batteries out on hire. *Mahindra is currently the only carmaker with electric vehicles in its portfolio:* the **Verito and e2o**. In an interview to ET on June 27, 2016, **M&M chairman Anand Mahindra had said electric cars would be feasible only for public transport**.

PENALTY FOR WASTING FOOD: CAN WE FOLLOW THE GERMAN EXAMPLE?

Efforts need to be taken to protect and preserve food grain for the benefit of the large number of poor in our society who are struggling to survive on a single meals a day

Germany is the fourth largest country in the world in terms of nominal gross domestic product (GDP). With a population of about 82 million, it has a per capita income of over $44,100 as per IMF estimates. It is the most developed country in Europe with technological leadership in several capital-intensive industries. Despite all these riches, its people are active in conserving their national resources, as is evidenced by the real life example conveyed by an Indian who visited the country. The following is a first-person account of an interesting incident that took place in Hamburg, Germany. We too need to cultivate such consciousness to preserve our national resources for the good of our people.

Penalty levied for wasting food in Germany

"When I arrived at Hamburg, my colleagues who work in Hamburg arranged a welcome party for me in a restaurant. As we walked into the restaurant, we noticed that a lot of tables were empty. There was a table where a young couple was having their meal. There were only two dishes and two cans of beer on the table. I wondered if such a simple meal could be romantic, and whether the girl will leave this stingy guy.

There were a few old ladies at another table. When a dish is served, the waiter would distribute the food for them and they would finish every bit of the food on their plates. We did not pay much attention to them, as we were looking forward to the dishes we ordered. As we were hungry, our local colleague ordered more food for us.

As the restaurant was quiet, the food came quite fast. Since there were other activities arranged for us, we did not spend much time dining nor did we consume the entire food that we had ordered. When we left, there was still about one third of the unconsumed food left on the table.

When we were about to leave the restaurant, we heard someone calling us. We noticed that the old ladies in the restaurant were talking about us to the restaurant owner. When they spoke to us in English, we understood that they were unhappy about us wasting so much food. We immediately felt that they were really being too busybodies.

'We have paid for the food that we had ordered, it is none of your business how much food we left behind,' my colleague told the old ladies.

The old ladies were furious. One of them immediately took her hand phone out and made a call to someone. Within a few minutes, a man in uniform claimed to be an officer from the Social Security Organization arrived. Upon knowing what the dispute was, he issued us a 50 euro fine. We kept quiet. My local colleague took out and gave him a 50 euro note and repeatedly apologized to the officer.

The officer told us in a stern voice, 'Order what you can consume, the money is yours, but resources belong to the society. There are many others in the world, who are facing shortage of resources. You have no right to waste the nation's resources.'

Our face turned red. We all agreed with him in our hearts. The mindset of people of this rich country put all of us to shame. We really need to reflect on this. My colleague took copies of the fine ticket and gave a copy to each of us as a souvenir. This will always remind us that we shall never be wasteful."

What is the moral of the story?

The moral of the story is loud and clear. Though our people rarely waste much food in restaurants, we as a nation waste a lot of food during marriages, festivals and other occasions without caring about the large percentage of our people that go hungry each day. The levels of poverty, hunger and deprivation are so high in our country and little attention is paid to this by the well-to-do citizens and the politicians of our country.

Otherwise, how do you explain the fact that the lack of proper storage facilities is resulting in rotting of foodgrain in our country? As per the media report dated 8 May 2010, the government has acknowledged that our country wastes Rs 58,000 crore worth of food items every year due to lack of or poor storage facilities. The condition of the godowns in the country is not good and that is resulting in the rotting of good grain.

The Union minister of state for food and public distribution stated last week that the government's food subsidy bill for the year is estimated to be Rs1.35 lakh crore and the government will have to procure about 62 million tonnes of good grain to meet the targeted public distribution system. If only the foodgrain wasted in the country due to lack of storage facilities was saved, the burden of subsidy would have come down to that extent and thus saved the tax-payers' money. But who cares?

Is there no solution to this problem?

The best way is to create awareness about the need to avoid wastage of food at all levels. But that alone will not solve the problem. There is a need to penalise people who are responsible for failure to preserve and protect the precious edible resources of the country as is done in Germany. This could have been easily done through the Food Security Bill that is awaiting the consent of the Parliament. But unfortunately, the Food Security Bill, in its present form, does not provide for any such provisions to penalise wastage of food, nor does it cast any obligation on the government in power to ensure that the people in charge should be held accountable for their failure to protect food grain produced in this country.

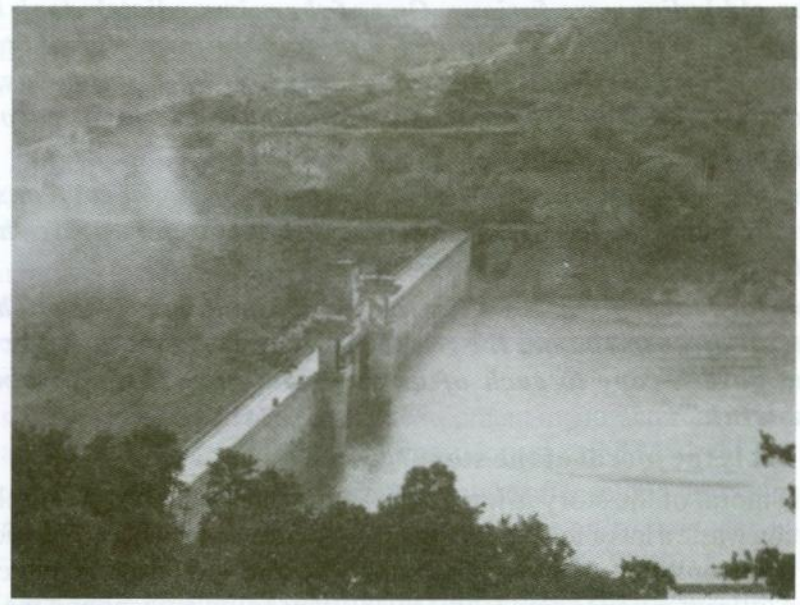
It is time to take note of the obligation of every citizen of this country to ensure that the food wastage is totally avoided. Efforts must be made to protect and preserve food grain for the benefit of a large number of poor in our society who are struggling to survive without even two square meals a day.

You have to grow from the inside out. None can teach you, none can make you spiritual. There is no other teacher but your own soul. - SWAMI VIVEKANANDA

TOP 10 MAJOR DAMS OF INDIA - 1

India is country with some of the **great rivers** like Ganga, Narmada and Brahmputra. These rivers are having some of the big dams and **largest reservoirs in India** such as Nanak Sagar and Indira Sagar. Lalitpur district in Uttar Pradesh is well known for its 7 dams, those are Rajghat dam, Matateela dam, Govindsagar dam, Sehjaad dam, Saajnam dam, Jamini dam and Rohini dam. Matatila dam is the biggest one form all of them with height of 33.53 meters on Betwa river. These large dams play an important role for Irrigation and Agriculture growth of the nation, but at the same time it affect the people and environment and wildlife.

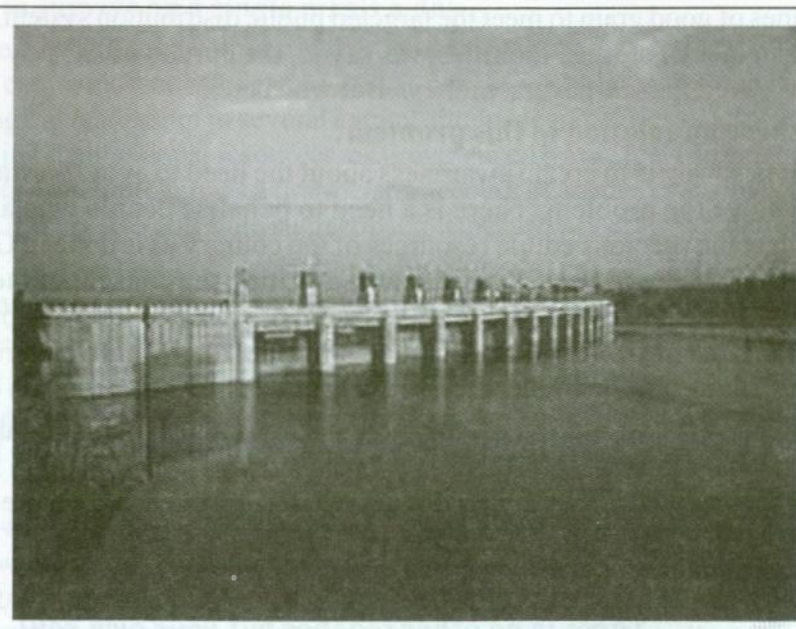
1. Cheruthoni Dam, Kerala



Cheruthoni Dam, the largest concrete gravity dam in **Kerala**, is located close to Idukki arch dam. It is the third highest dam in India with a 454 feet-high across River Cheruthoni. Idukki is a hill station in India, is much famous for its **wildlife treasure** keenly followed by other attractions too. These two dams are one of best picnic spot for the tourists, The Idukki and Cheruthoni dams opened to the public in connection with the **Onam festival** season. At the end of the Cheruthoni dam continue walking along the properly fenced road lead to Idukki Dam. The height of 560 feet brought a thrilling experience and wonderful view of **greens valley**.

Height: 450 feet
Length: 2300 feet
Type: Concrete Gravity Dam
River: Cheruthoni River
Location: Kerala
Installed capacity: 32 MW

2. Indira Sagar Dam, Madhya Pradesh

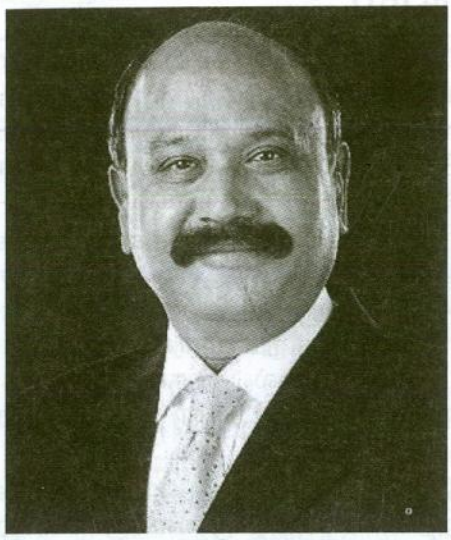


Indira sagar dam built on the Narmada river with a height of 92m. is concrete gravity dam, located in Khandwa district of **Madhya Pradesh**. Indira sagar project was the key project on Narmada river providing excellent storage site of water. Indira Sagar Dam has the biggest reservoir in India.

Height: 92 m
Length: 653 m
Type: Concrete Gravity Dam
River: Narmada River
Location: Madhya Pradesh
Installed capacity: 1,000 MW

(To be continued...)

G.M. RAO — *GMR Group* — ENTREPRENEUR



G.M. RAO, Founder
GMR Group

GMR started as a jute trader three decades ago and today he has become an associate of "Joy of Giving" with warren buffett!

Grandhi Mallikarjuna Rao a mechanical engineer from Andhra University is the Founder Chairman of GMR Group, a global infrastructure developer and operator based in India. GMR Group is now present in 7 countries, active in Energy, Highways, Large Urban Development and Airports sectors, known for building and operating world class national assets. Born in a small town of Rajam in Andhra Pradesh, Rao had started from a single jute mill in Rajam in 1978. A visionary businessman, he recognized the huge business potential in entering the infrastructure space, with the opening up of the power sector in the 90s in India. GMR is among the top five players in power producers' hierarchy with 7914.5 MW of power producing capacity. Realising that Airports will drive the economy in the 21st century, Rao spearheaded the Group's entry into the high profile airport business. The Group has developed the new Greenfield International Airport at Hyderabad, and has modernized the Delhi International Airport by constructing a world-class integrated terminal 3 (T3).

Rao has established GMR Varalakshmi Foundation – the Corporate Social Responsibility arm of GMR Group which spearheads GMR Group's initiatives in Education, Empowerment, Health and Hygiene. It has a presence in India and abroad. It focuses on Education, Empowerment, Health and Vocational training for the underprivileged. Rao pledged $340 millions (Rs 1,540 crore) to improve education among the underserved sections of the society. *For his visionary approach and outstanding contribution to ING Vysya Bank for two decades as its* **director** *and* **Chairman**, *the Bank in September 2006 conferred on him the status and title of* **'Chairman Emeritus'**. For his exemplary entrepreneurial / industrial achievements, he has received an **honorary Doctorate from the Jawaharlal Nehru Technological University**, Hyderabad, India. He has received many awards including **'Entrepreneur of the year' at the Economic Times**, Awards for Corporate Excellence, **Most Promising Entrant to the Big League'** by CNBC TV18 at its **'Indian Business Leader Awards 2007'** and **'Sir. M. Visveswaraiah Award – 2008'**. *In India Today High and Mighty power list 2013*, **Rao has been ranked No 33.**

HUMOUR

A young engineer was leaving the office at 6pm when he found his boss standing in front of a shredder with a piece of paper in his hand.

"Listen," said his boss, "this is important, and my secretary has left. Can you make this thing work?"

"Certainly," said the young engineer. He turned the machine on, inserted the paper, and pressed the start button.

"Well done, Well done!" said his boss as his paper disappeared inside the machine. "I just need one copy."

Reaching the end of a job interview, the Human Resources Manager asked the young engineer fresh out of university, "And what starting salary were you looking for?"

The engineer said, "In the neighborhood of Rs10,00,000 a year, depending on the benefit's package."

The HR Manager said, "Well, what would you say to a package of Rs20,00,000 a year, 5 weeks vacation, 14 paid holidays, full medical and dental, company matching retirement fund to 50% of salary, and a company car leased every 2 years - say, a red Mercedes?"

The engineer sat up straight and said, "Wow!!! Are you joking?"

And the HR Manager said, "Of course, ...but you started it."

Everything is easy when you are busy. But nothing is easy when you are lazy. - SWAMI VIVEKANANDA

நீங்கள் சர்க்கரை சாப்பிடுவதை நிறுத்தினால் நல்ல விஷயங்கள் நடக்கும்!!

சர்க்கரை சாப்பிடுவது உடலுக்கு நல்ல தல்ல. ஆரோக்கிய மற்ற சூழ்நிலையில் தான் சர்க்கரை உற்பத்தி செய்யப்படுகிறது. அதனை சாப்பிடுவதை நிறுத்தினால் உண்டாகும் நன்மைகளை பார்ப்போம். சர்க்கரை நாவை அடிமைப்படுத்தும் மிக மோசமான உணவுப் பொருட்களில் முக்கியமானது. பல நோய்கள் உண்டாவதற்கு சர்க்கரைதான் காரணம். சர்க்கரையை சாப்பிடுவதை குறைத்தாலே உங்கள் ஆரோக்கியம் மேம்படும்.

நினைவில் வைத்துக் கொள்ளுங்கள். இங்கு நாம் சாப்பிடும் பழங்கள், காய்கள், பால் ஆகியவற்றில் இருக்கும் இயற்கையான சர்க்கரையைப் பற்றி சொல்லவில்லை. நாமாகவே உணவுப் பண்டங்களில் சேர்க்கும் சர்க்கரைப் பற்றி தான் இந்த கட்டுரை, அதாவது பிஸ்கட்ஸ், சாஸ், இனிப்பு வகைகள், யோகார்ட் என பலவற்றிலும் சேர்ப்பவை நல்லதல்ல.

உங்கள் இதயம்: பல்வேறு ஆபத்தான தாக்குதலில் இருந்து உங்கள் இதயம் பாதுகாக்கப்படுகிறது. இன்சுலின் அதிகம் தூண்டப்படாத நிலையில் ரத்த அழுத்தம் அதிகமாவது தடுக்கப்படுகிறது. இதனால் இதய துடிப்பு பல மடங்கு ஆவதும் தடுக்கப்படுகிறது. இதனால் இதயம் பல மடங்கு பலம் பெருகிறது.

முகப்பரு மற்றும் சரும பிரச்சனை: டீன் ஏஜ் வயதினர் சாப்பிடும் இனிப்புகள்தான் சருமத்திற்கு முதல் எதிரி. முகப்பரு, எண்ணெய் வடிதல் ஆகியவை இல்லாத சுத்த சருமம் வெளிப்படும். இளம் வயதிலேயே வரும் முதிர்ச்சி தடுக்கப்படும்.

மகிழ்ச்சியாக இருக்கலாம்: சர்க்கரை அதிகம் சாப்பிடுபவர்களுக்கு அடிக்கடி மன உளைச்சல் மற்றும் மன தடுமாற்றம் உண்டாகும் என ஆராய்ச்சியாளர்கள் கூறுகிறார்கள். ஆனால் சர்க்கரையை சாப்பிடாமல் இருப்பவர்களுக்கு உங்கள் மனநிலையில் உள்ள முன்னேற்றம் மகிழ்ச்சியடைய வைக்கும்.

ஞாபக சக்தி: ஞாபக சக்தி அதிகரிக்கும், ஏனென்றால் அதிக சர்க்கரை மூளைக்கு செல்லும் தகவல் பரிமாற்ற சங்கிலியை உடைக்கும் ஆற்றல் கொண்டவை. இதனால் ஞாபக மறதி அடிக்கடி உண்டாகும். நீங்கள் சர்க்கரையை குறைக்கும் போது உங்கள் மூளை செல்கள் பலம் பெறும். நரம்பு மண்டலம் ஆரோக்கியமாக செயல் புரியும்.

4 கிலோ உடல் குறையும்: தொடர்ந்து 4.5 மாதங்கள் சர்க்கரை சாப்பிடாதிருந்தால் உங்கள் எடை 4 கிலோ வரை குறைந்திருக்கும் ஏனென்றால் நீங்கள் சாப்பிடும் சர்க்கரை ஒரு நாளைக்கு 20 கலோரி அதிகமாக காரணம். இதனாலே உடல் எடை கூடும்.

Courtesy: The Pesot, January 2017

சர்க்கரை நோயிலிருந்து விடுபட, இதை தினமும் 1 ஸ்பூன் சாப்பிடுங்க...

சர்க்கரை நோய் என்பது முற்றிலும் குணப்படுத்த முடியாத நிலை. இந்த சர்க்கரை நோய் தீவிரமானால், உயிரையே இழக்கக் கூடும். எனவே சர்க்கரை நோய் முற்றிய நிலையில் இருந்தால், உடனே அதைக் கட்டுப்படுத்தும் முயற்சியில் ஈடுபடுங்கள். சர்க்கரை நோயைக் கட்டுப்படுத்த எத்தனையோ வழிகள் உள்ளன.

இங்கு சர்க்கரை நோயைக் கட்டுப்படுத்தும் ஓர் அற்புத மருந்து கொடுக்கப்பட்டுள்ளது. இந்த மருந்து பாரம்பரியமாக சர்க்கரை நோயைக் கட்டுப்படுத்த உதவும். சரி, இப்போது சர்க்கரை நோயை கட்டுப்படுத்த உதவும் அந்த மருந்தை எப்படி செய்வதென்று காண்போம்.

தேவையான பொருட்கள்:

எலுமிச்சை – 6, செலரி வேர் – 300 கிராம்.

தயாரிக்கும் முறை:

முதலில் துருவிய செலரி வேரை, ஒரு மூடியுள்ள சிறு பாத்திரத்தில் போட்டு, அத்துடன் எலுமிச்சைகளைப் பிழிந்துவிட்டு, பாத்திரத்தை மூடி வைக்க வேண்டும். பின் பெரிய பாத்திரத்தில் நீரை நிரப்பி, அதனுள் அந்த சிறிய பாத்திரத்தை வைத்து, அடுப்பில் இட்டு, நீரை சூடேற்ற வேண்டும். நீர் கொதிக்க ஆரம்பித்ததும், தீயைக் குறைத்து, 2 மணி நேரம் குறைவான தீயில் வைத்து இறக்க வேண்டும். பின்பு சிறு பாத்திரத்தின் மூடியை திறக்காமல் இறக்கி வையுங்கள். நன்கு குளிர்ந்த பின் அதனை ஒரு ஜாரில் போட்டு சேகரித்துக் கொள்ளுங்கள்.

பயன்படுத்தும் முறை:

இந்த மருந்தை மினமும் காலையில் எழுந்ததும் வெறும் வயிற்றில், காலை உணவு உண்பதற்கு 30 நிமிடத்திற்கு முன் 1 ஸ்பூன் சாப்பிடுங்கள்.

இதர நன்மைகள்:

இந்த மருந்தை உட்கொள்வதால், உடலினுள் உள்ள அழுக்குகள் வெளியேற்றப்படுவதோடு, கொழுப்புக்கள் கரைக்கப்பட்டு உடல் எடையும் குறைவதைக் காணலாம்.

குறிப்பு:
இங்கு தயாரிக்க கொடுக்கப்பட்டுள்ள மருந்து 2 மாதத்திற்கு போதுமானது. இதனை தினமும் சாப்பிட்டு வந்தால், இரத்த சர்க்கரை அளவு கட்டுப்பட்டிருப்பதை நன்கு காணலாம்.

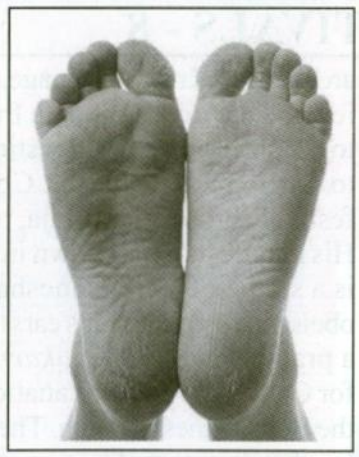
Courtesy: The Pesot, January 2017

ஓமத்தை எப்படியெல்லாம் பயன்படுத்தலாம்?

- அரை டீஸ்பூன் ஓமத்தை ஒரு லிட்டர் தண்ணீரில் போட்டுக் கொதிக்க வைத்துக் குடித்தால் ஆஸ்துமா அண்டாது. வயிற்றில் செரிமானம் சீராகும்.
- வயிற்று வலி ஏற்பட்டால், ஐந்து கிராம் ஓமத்துடன் சிறிது உப்பு, பெருங்காயம் சேர்த்துப் பொடித்து தேனில் குழைத்துச் சாப்பிட்டால் சிறிது நேரத்தில் வயிறு லேசாகி விடும்.
- நாட்டு மருந்து கடைகளில் ஓம எண்ணெய் கிடைக்கும். மூட்டு வலிக்கு இதைத் தடவினால் நாளடைவில் மூட்டு வலி குணமாகும்.
- மார்ச்சளி இருந்தால், ஓம எண்ணெயை மார்பின் மீது தடவ சரியாகும். பல்வலி இருந்தால், இந்த எண்ணெயைப் பஞ்சில் தோய்த்து பல் மீது வைத்து அழுத்திக் கொண்டால் பல்வலி மறையும்.
- வயிறு "கடமுடா"வென சத்தம் போட்டால், ஓம எண்ணெயை வயிற்றின் மீது தடவலாம்.
- ஓமப் பொடி சிறிது, உப்பு சிறிது ஆகியவற்றை மோரில் கலந்து குடித்தால், நெஞ்சில் படித்துள்ள சளி வெளியேறும். சுறுசுறுப்பின்றி சோம்பலாய் உட்கார்ந்திருப்பவர்கள் சிறிது ஓமத் தண்ணீர் குடித்தால், சோர்வு நீங்கும்.
- தொப்பையை குறைக்க தினமும் இரவில் தூங்க போகும் போது அன்னாச்சிப்பழம் நான்கு துண்டுகள் மற்றும் ஓமம் பொடி இரண்டு ஸ்பூன் இவை இரண்டையும் தண்ணீரில் விட்டு கொதிக்க விட வேண்டும். அவை நன்கு வெந்தவுடன் அதை அப்படியே மூடிவைத்துவிட வேண்டும். இவ்வாறு காலை 5 மணிக்கு எழுந்து அதனை நன்றாக கரைத்து குடிக்க வேண்டும். 15 நாட்கள் செய்து வந்தால் உங்களுக்குள் உள்ள தொப்பை காணாமல் போய்விடும்.

Courtesy: The Pesot, February 2017

பாத வெடிப்பை விரைவில் போக்க வேண்டுமா? ஈஸியான வழிகள்!!!



பாத வெடிப்பு அடிக்கடி வரும். குளிர்காலத்தில் இன்னும் அதிகமாகும். வலியையும் ஏற்படுத்தும். அதனை குணப்படுத்த இங்கே எளிய வழிகள் சொல்லப்பட்டுள்ளன.

பித்த வெடிப்பு நம் மீது நல்ல மதிப்பை அடுத்தவருக்கு பெற்று தராது. நம்முடைய ஒரு அலட்சிய போக்கையே காண்பிக்கும். பித்த வெடிப்பு அழகை குறைத்து காண்பிப்பதோடு ஆரோக்கியமற்ற சூழ்நிலையையே எடுத்துக் காட்டுகிறது. வெடிப்பை நிரந்தரமாக குணப்படுத்த முடியாது. ஆனால் வராமல் காத்திட முடியும். அதுபோல் வேகமாக மறையச் செய்துவிட முடியும். எப்படி என பார்க்கலாம்.

அரிசி மாவு: சிறிது அரிசி மாவில் தேன், ஆப்பிள் சைடர் வினிகர் கலந்து பேஸ்ட் போலச் செய்து கொள்ளுங்கள். அதனை பாதங்களில் தேய்த்து 10 நிமிடம் ஊறிய பின் கழுவினால் மிருதுவான பாதம் கிடைக்கும்.

வேசலின்: வேசலின் அல்லது வேற பெட்ரோலியம் ஜெல்லியை எடுத்து அதனுடன் சிறிது எலுமிச்சை சாறு கலந்து பாதத்தில் தடவுங்கள். 20 நிமிடம் கழித்து தேய்த்து கழுவ வேண்டும். இப்படி செய்து வந்தால் ஒரே வாரத்தில் வெடிப்பு மறைந்துவிடும்.

வாழைப்பழம்: வாழைப்பழத்தை மசித்து அதனுடன் சிறிது தேன் கலந்து பாதத்தில் தடவுங்கள். காய்ந்ததும் கழுவவேண்டும். இவ்வாறு தொடர்ந்து செய்தால் பாத வெடிப்பு மறைந்துவிடும்.

ஓட்ஸ் மற்றும் ஜொஜொபா எண்ணெய்: ஓட்ஸை மசித்து அதில் ஜொஜொபா எண்ணெய் கலந்து பாதங்களில் தடவி வந்தால் வெடிப்பு மறைந்து பாதங்கள் மிருதுவாகும்.

வெஜிடேபிள் எண்ணெய்: தினமும் இரவு தூங்குவதற்கு முன் வெஜிடேபிள் எண்ணெய் கொண்டு பாதங்களை மசாஜ் செய்யுங்கள், பின் சாக்ஸ் அணிந்து தூங்கச் செல்லுங்கள். வெடிப்புகள் விரைவில் மறைந்து பாதங்கள் மென்மையாவது உறுதி.

Courtesy: The Pesot, January 2017

Never say NO, Never say, 'I cannot', for you are INFINITE. All the power is WITHIN you. You can do anything. - SWAMI VIVEKANANDA

TIRUKKURAL AND MANAGEMENT IN A 'NUTSHELL' - 51

Recently, at a Conference of Business Leaders there were deliberations about what are the Qualities that make a Leader. One of the Top Business Leader in the meet presented a "5 – C" Model of Leadership, which are as follows:

a) Competency
b) Courage and Confidence (Paired into one)
c) Communication
d) Consistency
e) Compass or Integrity

Tiruvalluvar, no doubt, deals with all these in a very comprehensive manner and in this part, let us review what he has to advise us about **"Communication"**.

Tiruvalluvar deals with communication in three important dimensions of a) Truthful, purposeful and rightful contents of communication, b) Communication with pleasant and kind words full of clarity and without confusion and c) The communication should be crisp and with right purpose without any unwanted words. The following 3 Kurals illustrate these points clearly.

Yaammeyyak Kandavatrul Illai Enaiththonrum
Vaaimaiyin Nalla Pira ***Kural 300***

யாம்மெய்யாக் கண்டவற்றுள் இல்லை எனைத்தொன்றும்
வாய்மையின் நல்ல பிற. குறள் 300

"Many things have I seen in the World; but of all the things that I have seen, there is nothing higher than the Truth"

Insolaal Eeram Alaiip Padiruilavaam
Semporul Kandaarvayach chol ***Kural 91***

இன்சொலால் ஈரம் அளைஇப் படிறுஇலவாம்
செம்பொருள் கண்டார்வாயச் சொல். குறள் 91

"The Speech that is truely kind is the speech of the Righteous man which is full of tenderness and free from dissimulation"

Nayanilan Enpathu Sollum; Payanila
Paariththu Uraikkum Urai ***Kural 193***

நயன்இலன் என்பது சொல்லும் பயன்இல
பாரித்து உரைக்கும் உரை. குறள் 193

"He that multiplieth empty words declareth loud his want of worth"

HOME FESTIVALS - 8

ஆவணி - Avani (August/September)

This is a busy month, with two major festivals celebrated both at home and at the temple. Krishna Jayanthi, the birth of Lord Krishna, comes first. In the painting above is the rescue of the baby Krishna, who was born in a prison. His father carries him across a swollen stream while the seven-headed serpent, AdiSeshan, protects the incarnation of Lord Vishnu from the storm. In the Home, offerings of butter and yoghurt are made to Krishna's image, and footprints made with red powder reveal his path from the home's front door to the shrine room, suggesting that Krishna has come to participate. Ganesha Chathurthi is a mammoth festival across all of India, ten days in celebration of His manifestation. Shown in the center of the painting is a statue of Lord Ganesha and a devotee offering obeisance by pulling his ears and bobbing up and down, a practice called *thopukarnam* in Tamil, done only for Ganesha – one explanation being that it is to make the Baby Ganesha laugh. The icon of Ganesha is made by the devotees from river clay and painted and decorated. At festival's end is the Visarjana or departure, when the clay icon is placed into the river the Deity is bid farewell. In North India Visarjana is celebrated by millions of people. At far right in the art is depicted the story of Ganesha consuming so many sweet offerings that He had to tie a snake around his belly to keep it from bursting. Ganesha chastised the Moon for laughing at His predicament, and as penance the Moon has ever since waxed and waned through the month instead of remaining constantly bright.

(To be continued)

Printed and Published by 'Tamilnadu Electrical Installation Engineers' Association
"A" Grade, Chennai -14. Editor : G. Venkatesh Advisor : S. Mahadevan