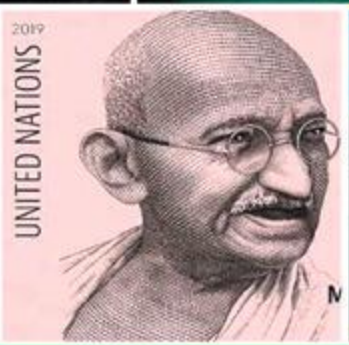
THE Green Energy Today

Vol : 1 Issue No - 1 (For Private Circulation) OCT 2019

Wishing you All
A Happy & Green Navathri

Govt of India Launches GREEN CRACKERS for this Deepawali



TAMIL NADU - GOING GREEN

Hon'ble Chief Minister of Tamil Nadu Edappadi K. Palaniswami launching the 'Tamil Nadu Electric Vehicle Policy 2019' on September 16, 2019 at Chennai.

The air-conditioned Electric bus, which is a long-term plan across the country is getting trial-run in many states. For the first time in Tamil Nadu, in Chennai, Electric bus was flagged off by the Tamil Nadu Hon'ble Chief Minister Edappadi K Palaniswami on Aug 26, 2019 which was supplied by M/s. Ashok Leyland.

This project with the objective of reducing air pollution is under the auspices of Govt. of India's FAME (Faster Adoption and Manufacturing of Hybrid & Electric Vehicles) INDIA-2, a programme to encourage the purchase and usage of electric vehicles. Under this, the government of Tamil Nadu had agreed to purchase and operate 525 electric buses in major cities like Chennai, Madurai, Coimbatore, Trichy, Erode, Tiruppur, Salem, Vellore and Thanjavur.

This Electric Bus is purely operated by battery and the battery range is to cover up to 40kms in a single ride. The batteries can be easily swapped within a few minutes. It is also proposed to charge the batteries with Solar Panels in a phased manner as per the E Vehicle policy.

Though the initial cost of the electric bus comes at a rate of Rs 1.5 crore to Rs 2 crore and appears to be high, the operative cost of Electric Green bus is very much low compared to the diesel bus in the city as there is no recurring expenditure.The passengers are immensely happy to travel in the zero-pollution Electric **Green Bus**.

Launching of Electric Vehicles (EVs) Electric Bus and Electric Car by the TN Chief Minister.

Chief Minister Edappadi K Palaniswami flagged off KONA Electric, India's first fully-electric SUV manufactured by Hyundai Motor India Limited on July 24, 2019.

The CM, Deputy Chief Minister O Panneerselvam and State Ministers Kadambur Raju and MC Sampath took a test drive of the car for some distance around the Secretariat. Kona Electric is part of Hyundai Motor India's commitment to invest Rs 7,000 crore in Tamil Nadu and the MoU was signed in this regard at the second Global Investors Meet in January.

The Kona EV for India comes with a 39.2kWh battery which has an ARAI-certified range of 452 km on a single charge, that is, one can travel from Chennai to Madurai on a single charge. The car is provided with two chargers one for charging the battery with normal plug point. With the special charger, the battery could be charged within five hours.

S.S. Kim, Managing Director and Chief Executive Officer, Hyundai Motor India said, "The KONA Electric is an expression of our commitment to the Indian market and bringing clean mobility solutions to India". He also said that Hyundai and Tamil

You Can also send your Feedback to

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This issue of this magazine is printed and circulated at FREE OF COST in the interest of Public especially to the Youth towards their Skill Development for the purpose of dissemination of knowledge in the frontier Green technologies including PV, EV etc., on behalf of Sai's Village Institute for Technology Transfer (SVIT), a Registered Public Trust with more than 15 years of dedicated service to the Society.

SPONSORSHIP/ CONTRIBUTION IN ANY FORM ARE SOLICITED for creating corpus fund for this Trust, including the CSR from Corporate Companies.

Any such Contribution to M/s. Sai's Village Institute for Technology Transfer (SVIT), is exempted under 80-G of the Income Tax Act.

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Editorial...

Green Greetings on behalf of publishers and SVIT.

G-Few stands for Global Forum of "Energie Wende", meaning "Energy Transition" from fossil fuel to renewable spear headed by Germany.

Government of India had announced an ambitious target of renewables to 175GW; looking at the pace of development the target is not ambitious but visionary from our Prime Minister & Power Minister.

However, financial and time constraints to reach these by 2022 is only possible not by mere policies but only by socio political movement to provide a green environment with inclusive growth of individuals, community and the Nation as part of sustainable society of the world.

The Green Energy Today, we can perceive as a prompt move in time in the perspective direction to create the much needed green awareness through societal awareness creation. Well timed monthly magazine will be bridging the industry, institutions, Government, over Academia and best practices of Renewable Energy in southern India initially and serve as a curtain raiser to national and international humanity at large.

With announced potential of 750GW in Solar and 302GW in wind by a Niti Aayog report, achieving 100GW solar and 60GW wind is certainly not impossible if there is a will by the society, energizing a mass movement and concern for the energy needs of our own fellow country men and women who are deprived of needed energy access.

This first issue rightly highlights the pros and cons (less) of higher penetration of renewables such as Wind and Solar energy and contemporary needs of grid stability and auxiliary or storage support systems.

Academia has the required high technology knowledge and manpower for capacity building for training of trainers and skill training. Industry knows the business how to make money multiply by investment and reaping the fruits. Research resulting in lab to land (Field) implementation needs the marriage of **Academ**ia actively supported by **Industry (AIR**) for usable **Researc**h.

Essentials for RE penetration in terms of energy mix in real term needs the infirmity or intermittency handled efficiently using accurate forecasting and energy scheduling in the grid operations.

India has Tamil Nadu as an example state with highest renewable energy mix well managed in spite of hurdles few years back. TANGEDCO has been unique with the state of the art REMC in India, (Renewable Energy Management Centre) and in a fast track mode modernizing the distribution system with smart meters and energy efficient transformers, centrally monitored in their Load Dispatch Centre.

If one looks at priorities for smooth transition to renewables, it has to start at your house. The Green building initiative not only pave the way for self generation of green power on their roof top by the affordable societal members but also relieve the load demand from the grid and the released energy will be to cater to the deprived lot as well as for the envisioned new industry.

This is the way Germany has increased its RE presence in Grid to as high as 35% and with "EnergieWende" they want to be 100% RE by 2030.

Green Jobs would attract the reader with a great purpose in the scenario of growing challenges of employability, startups, of the highest number of world's youth living in India.

I appreciate and congratulate all the contributors, their synergy with SVIT and their dedicated hard work to GET (Green Energy Today) this released in time. I feel honored and humbled to serve in the Editorial Team of "GET".

The smart intension of society-centric charity groups, I am doubly sure, would enable greater awareness of the boot strapping renewable sector by this very first issue of "The Green Energy Today"

We seek your sincere support and constructive contributions to innovate and transform to visionary "New India".

Dr Goms

From the Publisher...

Dear Reader,

Greetings from 'THE GREEN ENERGY TODAY' !

'THE GREEN ENERGY TODAY', a dedicated monthly magazine for the Green Energy and probably the first of its kind from South India published by the Sai's Village Institute of Technology Transfer (SVIT), Chennai.

'THE GREEN ENERGY TODAY', the monthly magazine is the dedication of SVIT on entering its 16th year of its service to the Society.

It is my privilege to introduce SVIT as a registered Public Charitable Trust serving the Society focused on disseminating knowledge by way of technology transfer since 2003.

SVIT has been putting efforts in taking the real benefits of technology to the gross root level of villages by way of launching several movements such as the 'Computer Literacy Movement' and the 'Organic Farming Movement'

Presently, SVIT is serving on the cards of the 'Go Green Movement' and has been working on several fronts including that of Tree planting.

'THE GREEN ENERGY TODAY' was conceived for meeting the following challenges:

- As you all know that "Knowledge is Power". But, in this fast changing Scientific World, Innovations and Technological Advancements takes place every day and pushing back our existing Academic curriculum even without time for updating. But, the advancements and Innovations are immediately put in to the use of Industry.
- So, there appears to be a huge gap between the Industry and Academia. We feel that our Youth can catch up such advancements required for the Industry by way of acquiring them as Skills in addition to their regular curriculum.
- One such gap was found in the frontier Green Energy sector. It was really amazing to note that there is a huge potential to the extent of 3.0 million Green jobs by the year 2022 as per some of the Govt of India's Study Reports,
- So, we at SVIT thought that our Youth should not be deprived of knowledge in the Green Energy sector,
- For meeting such huge potential of skilled manpower in the green energy sector, we need to equip our youth with additional skills apart from their routine academic activities,
- So, SVIT was in the process of identifying the Key Experts as Resource Persons for bringing out Study Materials for acquiring additional skills.
- During that process, we have identified an Eminent Engineer from TANGEDCO by name Dr.S.Sankara Narayanan at Chennai. A philanthropist in nature, he was kind enough to give our SVIT, all the rights to publish a book on one of the frontier Green Energy Technologies via the Solar energy, titled "THE POWER OF SOLAR POWER" and we at SVIT are already in the process of bringing out the book soon,
- In this context, it is my pleasure to mention here that we are really fortunate to have an excellent team of Key Resource Persons with each one of them having more than about 30 years of wisdom in

their respective fields of Green Energy and are ready to help SVIT as our Honorary Editorial Team in fulfilling the vision of SVIT in bringing out a Magazine (Electronic & Print) namely 'THE GREEN ENERGY TODAY'.

- In the Green Energy sector, there appears to be a huge gap between the Industry and Academia. 'THE GREEN ENERGY TODAY' will try to attempt in enriching those required skills for the Industry requirements and will try to attempt in bridging & minimizing the gap.

This issue of this magazine is printed and circulated at FREE OF COST on behalf of our Trust, at present.

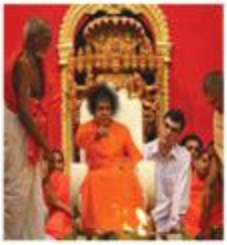
Hence, we request you to support our Monthly Magazine 'THE GREEN ENERGY TODAY' by way of your contribution/subscription and use this as a knowledge sharing platform for building a better society & Nation.

This small initiative of SVIT's, 'THE GREEN ENERGY TODAY' magazine is a humble dedication to the United Nations in its Agenda of "Transforming our world: the 2030 Agenda for Sustainable Development" through its 17 SDGs - Sustainable Development Goals.

With dreams of a Clean & Green Planet,
Sai S.Meena,
Publisher.

Cover Story- Happy Navarathri...

Navarathri is being celebrated every year by Sathya Sai Seva Organisations throughout the World and also at the Prasanthi Nilayam, Puttaparthi. This year, the Navarathri was celebrated between 29 Sep to 8 Oct 2019.



Bagwan Sathya Sai Baba in one of His Divine Discourses on 14 Oct 1988 narrates about the importance of celebrating Navarathri.

"The life of a man who cannot respect and love one's mother is utterly useless. Recognizing one's mother as the very embodiment of all divine forces, one must show reverence to her and treat her with love. This is the true message that this nine-night festival (the Navaratri) gives us. The supreme Shakti manifests herself in the form of Durga, Lakshmi, and Saraswati. Durga grants us energy – physical, mental, and spiritual. Lakshmi bestows on us all forms of wealth – not just money but intellectual wealth, the wealth of character, and others. Even health is a kind of wealth. She grants untold riches to us. And Saraswati bestows intelligence, the capacity for intellectual inquiry, and the power of discrimination on us. The Navaratri festival is celebrated in order to proclaim the power of the goddesses to the world. One's own mother is the combination of all these divine beings. She provides us with energy, wealth, and intelligence. She constantly desires our advancement in life. So she represents all the three goddesses that we worship during the Navaratri festival."

Cover Story
PM @United Nations

Addressing the 74th session of the United Nations General Assembly (UNGA) on 27 the Sep 2019, the Indian Prime Minister Shri Narendra Modi said in the last five years, India has worked towards strengthening its centuries-old great tradition of "fraternity among nations" and welfare of the world, which is indeed, in line with the key objectives of the United Nations.

In his Address, he has invoked the Tamil Poet, Kanian Pungranar as below:

"3000 years ago, a great poet of India, Kaniyan Pungundranar wrote in Tamil the most ancient language of the world "Yaadhum Oore Yaavarum Kelir" which means 'We belong to all places, and to everyone'. This sense of belonging beyond borders, is unique to India."

He continued his Address as below:

"If you look at it from a historic and per capita emission perspective, India's contribution to Global Warming is very low.

However, India is one of the leading nations when it comes to taking steps to address this issue.

On one hand, we are working towards achieving the target of 450 Giga Watts of renewable energy, and on the other hand, we have also taken the initiative to create the International Solar Alliance.

One of the effects of Global Warming is the increasing number and severity of natural disasters, and at the same time they are appearing in new areas and in new forms.

In view of this, India has initiated the formation of the "Coalition for Disaster Resilient Infrastructure" (CDRI). This coalition will help build infrastructure which can withstand natural disasters".

Prime Minister Shri Narendra Modi addressed the Climate Action Summit's opening ceremony organized by the UN Secretary General on the sidelines of the UN General Assembly.

Speaking on the occasion, the PM said that this was the first opportunity to address the United Nations, after having received the Champion of the Earth award last year.

He said that to overcome a serious challenge like climate change, what we are doing at the moment is just not enough. He called for a global people's movement to bring about behavioral change.

He said that the respect for nature, the judicious use of resources, reducing our needs and living within our means have all been important aspects of both our traditions and present day efforts. He added that Need not Greed have been our guiding principle. And therefore India today has come not just to talk about the seriousness of this issue, but to present a practical approach and a roadmap. We believe that an ounce of practice is worth more than a ton of preaching.

He pledged that the share of non fossil fuel will be increased, and by 2022 India's renewable energy capacity would be increased too much beyond 175 GW, and later till 450 GW.

He said that India plans to make the transport sector green through e-mobility and considerably increase the proportion of the bio-fuel blend in petrol and diesel.

He added that clean cooking gas has been provided to 150 million families in India.

The Prime Minister Shri Modi said that Jal Jeevan mission has been launched for water conservation, rainwater harvesting and for the development of water resources and approximately 50 billion dollars is going to be spent on this in the next few years.

He said that on the International forum, almost 80 countries have joined our International Solar Alliance campaign. India and Sweden together with other partners are launching the Leadership group within the Industry transition track. This initiative will provide a platform for governments and the private sector with opportunities for cooperation in the area of Technology innovation. This will help to develop low carbon pathways for industry.

He said that in order to make our infrastructure disaster resilient, India is launching a Coalition for Disaster Resilient Infrastructure and invited other Member states to join this coalition. He added that this year on the occasion of India's Independence Day on 15th August, a people's movement to end the use of single use plastic was called for. He emphasized that the time for talking is over; the world needs to act now.

Prime Minister of India Shri Narendra Modi was conferred the "Global Goalkeeper" award by the Bill and Melinda Gates Foundation for the Swachh Bharat Mission launched by his government.

Accepting the award, the Prime Minister Shri Modi said he shares the honour with crores of Indians who had contributed to the success of the mission.

The Prime Minister said, when 130 crore people take a pledge, any challenge can be overcome.

On 24th Sep 2019, the Indian mission to the UN in New York organised the 150th anniversary event to commemorate Mahatma Gandhi in the UN called 'Leadership Matters: Relevance of Gandhi in Temporary Times'.

There were three launches at the event:

1. Gandhi Solar Park: Installation of solar panels on the rooftop of the UN building in New York from a grant of $1 million that India has given.

2. Remote inauguration of the Gandhi Peace Garden in a university.

3. Release of a UN postage stamp.

The Indian Prime Minister Shri Narendra Modi along with other world leaders and with the UNSG Mr. Antonio Guterres inaugurated the 'Gandhi Solar Park' at the UN headquarters and released a commemorative stamp issued by the UN on the occasion of Gandhi's 150th birth anniversary.

Renewable and Energy Storage

Er. A.D.Thirumoorthy,
Indian Wind Power Association (IWPA).

Energy storage has become a hot topic in the industry in the last couple of years.

To understand, let's start with the utility grid. In order to maintain the flow of power efficiently, utility operators must attempt to steady the supply and demand consistently in order to meet peak demand.

Typically, most utility grids do not store energy because it would be a vastly expensive undertaking. As a result, the utilities call upon the use of additional fossil fuel burning plants to ramp up or down as needed to provide for demand. However, this method is not at all ideal because these plants operate more efficiently when running at full power.

Therefore, utilising these extra plants to smooth out the distribution of energy is contributing more pollution than the plants that are burning fossil fuels for the utility's base-load energy demands.

Within the last several years, a new and driven discussion has begun to take shape that would shift our energy consumption to less polluting forms of energy.

While there have been other avenues of energy production apart from use of coal, such as carbon capture, nuclear energy, and natural gas, these have all begun to lose momentum as popular solutions to reducing greenhouse gas emissions.

Currently, solar and wind energy have seen a significant increase in their market share and are becoming cost competitive in a great number of areas. Their portion of energy generation has been steadily expanding in various places around the world.

However, wind and solar, come with their own unique drawbacks. Each of these resources is

intermittent; we know the sun does not shine at night and that in many places wind resources are seasonal. These factors add to the grid's need for frequency regulation.

For example, when a cloud passes beneath the sun or the wind happens to drop off suddenly the energy that is being fed into the grid is not available and the grid becomes unstable having to compensate to meet demand.

Therefore, as the percentage of solar and wind energy increases, asking more from our grid, added flexibility is needed for the entire system. This can be remedied by a demand response.

In other words the capability to balance the sudden supply and demand by turning power on or off in localised bursts. Here energy storage comes into play.

California is a great example where energy storage may help to balance the grid through the use of energy storage because of the target goal to have 33 percent renewable energy by 2020.

Due to the large amount of solar that is already installed and connected to the grid in California, voltage is beginning to be effected, so that the state has zeroed in on storage as the key component of the smarter grid.

In 2010, California Public Utilities Commission (CPUC) was the first to pass an energy storage mandate, which would require the three largest utilities in the state to use 1,325 MW of energy storage by 2020, requiring that the utilities set energy storage targets.

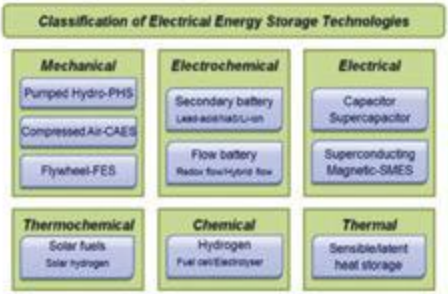
Although energy storage would provide frequency regulation on the grid and assist to stabilise intermittent solar and wind energy, it can also provide other assets as we move toward having a smarter grid.

The idea being that energy storage can save the utilities and their customers by eliminating the need for expanding new transmission lines and infrastructure.

By nature, energy storage is able to provide backup power when grid power is lost, a characteristic that is of great interest to residential customers as well.

Energy storage is of interest to the utility because they can store energy that is produced by their plants or wind energy, at night when peak demands are lowest, and release the energy stored during the day when the demand is higher (and also the cost).

Energy storage will continue to see advances and more manufacturers enter the market as it continues to expand and mature. We will surely see our grid surely reach the goal of becoming more efficient, stable and (hopefully) less costly as we venture to having a "smart" grid.



India could have 25% Renewables by 2030 with a million solar jobs-IRENA

India could become the fourth largest market for renewable energy in the world by 2030 with 25% renewables in its energy mix, according to a new report by the International Renewable Energy Agency (IRENA).

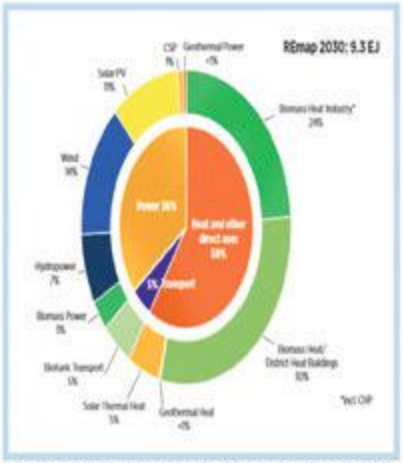
The study 'Renewable energy prospects for India' picked out solar as having a key role to play becoming the country's second largest source of renewables generation by 2030 with a 16% share, followed by wind (14%) and hydro (7%).

Bio-fuels, often overlooked in the media discussion of renewables, were tabbed as having a huge 62% chunk of the total renewables capacity due their ability to be used in multiple applications including transport, electricity generation and heating.

The report noted that increasing deployment of renewables would result in 12 times more savings for the economy than its costs by 2030, combined with other benefits in job creation, health and environment. IRENA cited studies indicating that India could have over a million jobs in solar energy and over 180,000 in wind energy just by 2022.

But to achieve this, India urgently needs to address and training and skills development shortfall.

The projected renewables additions would also lower the demand for coal and oil products between 17-23% in the same period.



India-Renewables power generation technologies Credit: IRENA

However, IRENA noted that investment in renewables needed to be scaled up significantly and to do this mobilising affordable financing and adapting new business models will be essential.

IRENA director-general Adnan Z. Amin said: "With one of the world's largest and most ambitious renewable energy programmes, India is taking a leading role in the energy transformation both regionally and globally.

India possesses a wealth of renewable resources, particularly for solar and bio-energy development, which can help meet growing energy demand, power economic growth and improve energy access, as well as boost overall energy security."

India's total gross power capacity will more than double from 284GW in 2015 to an estimated 670GW by 2030, while electricity generation more than triples from 1,100TWh per year to over 3,450TWh per year.

However, more than three-quarters of this new production is to be met by new coal-based capacity, under current plans.

Why don't you give your valuable suggestions for Improvement of this Magazine?
Pl send mail to:
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Promotion of Concentrating Solar Thermal Technologies to reduce the dependency of fossil fuels in India

Pankaj Kumar
National Technical Expert (Solar),
UNIDO, New Delhi.

Introduction:

India is endowed with a vast solar energy potential. About 5,000 trillion kWh per year of solar energy is incident over India's land area, with nearly all of India receiving an average sunshine hour of 5 – 7 kWh/m^2/day. The abundant solar radiation, clean character of solar energy, high cost of fossil fuels and negative emission consequences, along with large requirements for process heat below 250°C are the key drivers of the strong focus on the development of solar thermal applications in India. The use of solar concentrator to meet the process heat requirement of community, industrial and commercial establishments is an emerging and exciting market opportunity in India. The heat requirement is met by burning conventional fuels such as coal, furnace oil, natural gas and electricity. Use of solar concentrator technology integrated with system process heat demand can help replace / reduce conventional fuels which in turn will help reduce GHG emissions.

MNRE & UNIDO financial supports

The Ministry of New and Renewable Energy is implementing a programme on solar thermal aimed at peak shaving, conservation of electricity and fossil fuels and providing a clean, non-polluting solution to meet the process heat requirement in community, commercial and industrial sectors. Various promotional incentives in the form of Central Finance Assistance (CFA) are available for concentrating solar thermal projects under the JNNSM.

In addition, the GEF-UNIDO project on "Promoting Business Model for increasing penetration and scaling up of solar energy" was designed to complement Ministry (MNRE) support programme by helping to remove barriers associated with Concentrating Solar Thermal (CST) technologies, its

awareness, capacity building, market and financial **barriers**.The implementing partners of the CST project is Ministry of New and Renewable Energy (MNRE), Indian Renewable Energy Development Agency (IREDA), and National Institute of Solar Energy (NISE).

The project was conceived with an aim to contribute to the GEF Climate Change Strategic Objective namely, promoting investment in Renewable Energy (RE) technologies by transforming the market for solar energy for industrial heat applications in India through investment, market demonstration, development of appropriate financial instruments, development of technical specifications, capacity building and contributions to establish a favorable policy and regulatory environment.

Target Technologies for Heating and Cooling through CST

The different types of concentrating solar thermal technologies have been developed or are currently under development for various commercial and industrial applications.

Figure 1: CST technologies

For industrial processes where temperatures above 80°C are required, concentrating solar collectors such as parabolic trough, paraboloid dish, non-imaging concentrators, a Linear Fresnel based system are required to be used.

Status and Installation of CST project in India

The total projects installed with the support from the Ministry are 65461.12m² of collector area. Out of these 245 projects, 154 projects with 30010.6m² collector area were installed for community cooking, 61 of 23491.12 m² for process heat, 13 with 9543.6 m² for cooling application and 17 projects of 2415.8m² for other applications.

The state-wise installations of CST projects used in different applications are shown in the figures below:

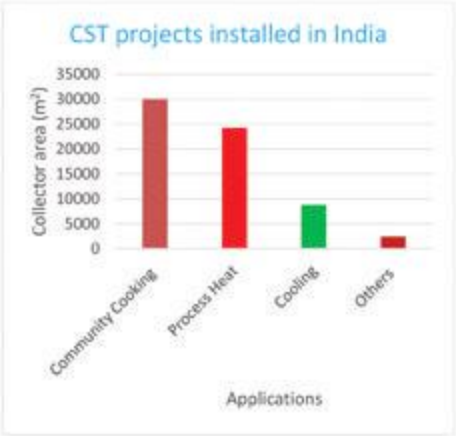


Figure 2:
Application-wise CST system installed in India

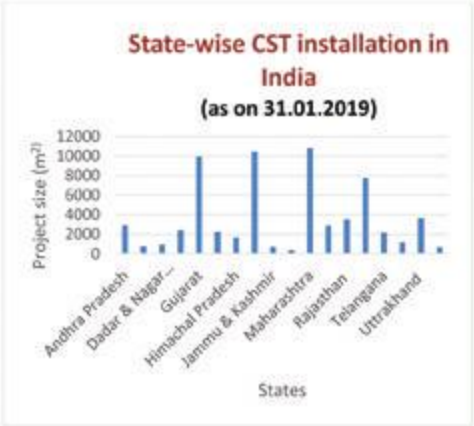


Figure3:
State-wise installation of CST projects
(more than 500m² project size)

The project payback usually depends on the cost of the substituted fuel. It ranges from 3–4 years for process heat applications if the substituted fuel is furnace oil, diesel, or PNG. The payback may be slightly longer (5–7 years) to substitute solid fuels such as coal, biomass, and wood. The longer payback period is also seen in cooling applications.

Capital subsidy & Soft loan scheme for CST projects:

Central Finance Assistance from MNRE:

The capital subsidy per unit collector area, as given above, is based on 30% of the benchmark costs. Capital subsidy would be computed based on the applicable type of solar collector multiplied by the collector area involved in a given solar thermal application or project.

Tab1: Capital subsidy based on Technologies

Type of Solar Collector	Benchmark Cost (Rs/m²)
Concentrator with manual tracking (dish solar cookers)	7,000
Solar collector systems for direct heating and drying and non-imagine/ Compound Parabolic Concentrators (NIC/CPC)	12,000
CSTs with single axis tracking (including Scheffler dish)	15,000
CSTs with single axis tracking, solar grade mirror, reflector and evacuated tube collectors	18,000
CST based on double axis tracking	20,000

Soft Loan Scheme under UNIDO-IREDA supported MNRE project:

UNIDO has partnered with IREDA (Indian Renewable Energy Development Agency) to develop and implement an innovative finance/loan scheme to further promote the deployment of CST projects in India for heating and cooling applications in potential industries to reduce energy consumption and Greenhouse Gas (GHG) emissions. The highlights of the currently available financial incentives are as follows.

- The beneficiary's or project developer's contribution would be 25%.
- The financial incentives provided for CST installation include CFA (Central Financial Assistance) from MNRE at 30% of the benchmark solar project cost, and accelerated depreciation benefit.
- Additional support is available from UNIDO project in terms of technical feasibility and soft loan from IREDA.
- Bridge loan against subsidy and at normal interest rate would be available.
- Support is available also for improving the manufacturing of CST system/components.

Loan for the CST project would be provided at an interest subvention of 5% from the current rates using funds under the project. Both the loan and MNRE subsidy would be bundled in form a financial package by IREDA. The details of the loan scheme and the application form are available on the MNRE, IREDA & UNIDO websites.

The project developers and beneficiaries may contact UNIDO for further information on the loan scheme and the technical support available from UNIDO for CST projects for industry process heat applications.

2nd INTERNATIONAL CONFERENCE ON LARGE SCALE INTEGRATION OF RENWABLE ENERGY IN INDIA @ Delhi-04-06 Sep 2019:

Conference partners:

With more than 160 received abstracts from submitters of 14 different countries were able to offer a top-class agenda to the participants of the 2nd International Conference on Large-Scale Grid Integration of Renewable Energy in India from 4 – 6 September in New Delhi endorsed by the Ministry of New and Renewable Energy as well as the Ministry of Power.

The following are the Members of the Advisory Committee:

- A.R. Abhayankar | IIT Delhi, India
- Thomas Ackermann | Energynautics, Germany
- Lakshmi Alagappan | Ethree, USA
- K. Balaraman | NIWE, India
- Rangan Banerjee | IIT Mumbai, India
- Pankaj Batra | ex-CEA, India
- Martin Braun | University of Kassel, Germany
- Anjuli Chandra | PSERC, India
- Jaquelin Cochran | NREL, USA
- Winfried Damm | GIZ, Germany
- Jaap de Boer | Energy Watch, Netherlands
- Shantanu Dixit | PRAYAS (Energy Group), India
- Bernhard Ernst | Bernhard Ernst Energy Consulting, Germany
- Ana Estanqueiro | LNEG, Portugal
- Alain Forcione | IREQ Hydro Québec, Canada
- Michael Nørtoft Frydensbjerg | Vattenfall Renewables Wind, Denmark
- Paul Gardner | Paul Gardner Energy Consulting Ltd., United Kingdom
- Minaxi Garg | POSOCO, India
- Detlev Heinemann | University of Oldenburg, Germany
- Hannele Holttinen | VTT, Finland
- Vibhu Kaushik | Southern California Edison, USA
- Tanja Manuela Kneiske | Fraunhofer IEE, Germany
- Ashvini Kumar | TERI, India
- Sudipta Lahiri | DNV GL, USA
- Lars Landberg | DNV GL, Denmark
- Julia Matevosyan | ERCOT, USA
- Nickie Menemenlis | Hydro Québec-IREQ, Canada
- Arun Kumar Mishra | National Smart Grid Mission, India
- Sukumar Mishra | IIT Delhi, India
- Indradip Mitra | GIZ, India
- Mahesh Morjaria | First Solar, USA
- Lise Nielson | Linie P, Denmark
- David Palchak | NREL, USA
- Jyoti Parikh | IRADe, India
- Ghanshyam Prasad | Ministry of Power, India
- Rupam Raja | Fluence, India/USA
- Abhishek Ranjan | BRPL, India
- Nigel Schofield | University of Huddersfield, United Kingdom
- Ghosh Shibani | NREL, USA
- Anoop Singh | IIT Kanpur, India
- Vandana Singhal | CEA, Distribution Policy and Regulations Division, India
- Anjan Kumar Sinha | GTG-RISE, India
- Robert Staton | Xcel Energy, USA
- Jian Sun | Rensselaer Polytechnic Institute, USA
- Adrian Timbus | ABB, Switzerland
- Manish Tiwari | Power Grid, India
- Markus Wypior | GIZ, India

"Renewable Energy India-2019 Expo" @ Delhi promises to bolster India's image as a clean energy champion

The 13th edition of "Renewable Energy India 2019 Expo" observed a grand opening on the first day the 18th Sep'19, with participation from leading international stakeholders and experts from across the globe at the India Expo Centre, Greater Noida .

This year, the event brought together decision makers and influencers as well as technical experts and professionals from leading companies involved in the renewable energy generation, transmission and distribution to regulatory framework and its challenges.

The expo commenced with an opening ceremony where global and national leaders, from Bloomberg New Energy Finance, EY India Power & Utilities Leader, and Freiburg among others joined hands to encourage World Energy Sustainability along with key government dignitaries from Brazil, Government of India, State of Madhya Pradesh, State of Telangana to highlight benefits & future plans.

The panel was graced by key dignitaries - Mr. Justin Wu, Head of APAC, Bloomberg New Energy Finance; Mr. Somesh Kumar, EY India Power & Utilities Leader; Shri Ajay Mishra, IAS, Special Chief Secretary, Energy Department, Government of Telangana; Shri Manu Srivastava, IAS, Principal Secretary, New & Renewable Energy Department, Government of Madhya Pradesh; Prof. Eicke R. Weber, Former Director, Fraunhofer ISE, Freiburg ; Dr. Michael K. Dorsey, Co-founder and Principal of Around the Corner Capital ,Partner, IberSun (Spain/USA) & Pahal Solar (India); Md. Enamul Karim Pavel, Head of Renewable Energy, IDCOL, Bangladesh; Md. Enamul Karim Pavel, Head of Renewable Energy, IDCOL, Bangladesh; Mr. Yogesh Mudras, Managing Director, for Informa Markets in India and Mr. Rajneesh Khattar, Group Director, Informa Markets in India.

In his opening remarks, Mr. Yogesh Mudras, Managing Director for Informa Markets in India , India said, "Renewable Energy India 2019 Expo, provides an unique and incredible platform which brings policy makers and industry experts together under one roof to discuss overall concerns of the industry and best ways to manage them".

The dignitaries present on the first day at the event were Somesh Kumar, Partner adouble-digittr &Utilities), Ernst & Young LLP; Ashish Khanna, President Renewables, Tata Power & MD & CEO, Tata Power Solar; Simon Stolp, Lead Energy Specialist, World Bank; Shaji John, Head- Business Development Domestic & Global Renewables Business L&T; Daniel Liu, Managing Director South Asia, Jinko Solar; Dr. Anurrat Joshi, Head Business Development, Cleantech Solar; Arvind Reddy, CEO, Inmolia Energy Pvt. Ltd; Santosh Khatesal, Managing Director, Enerparc Energy Pvt. Ltd.; and A.K. Jain, Managing Director, Rajasthan Electronics and Instruments Limited (REIL) amidst an august industry gathering.

Utilizing this opportunity, the Indo German Energy Forum hosted the discussion on business opportunities in residential solar and Agro Photovoltaics, while PV magazine hosted a discussion on best practice guidelines for large scale projects, O&M and installation led by Jonathan Gifford, Editor in Chief Global, PV magazine group and Subrahmanyam Pulipaka, CEO, National Solar Energy Federation of India.

Leading associations like Indian Bio Gas Association, Indo German Energy Forum, Solar Business Club, All India Solar Industries, APVIA, Indo German Chamber of Commerce, Skill Council for Green Jobs, National Solar Energy Federation of India and GIZ, among others International Solar Energy Society, Indo-German Energy Forum SO, Natural Resources Defense Council, Global Energy Storage Alliance, Standards and research, Skill Council for Green Jobs, supported REI 2019 to accelerate discussion around, best practices in the domain, distribution and role of startups in renewable energy.

Green Events

Govt. of India launches 'GREEN CRACKERS' from this Deepawali-2019

Govt. of India launches "GREEN CRACKERS" in its bid to curb air pollution

Green Logo and QR coding system also launched to track manufacture & sale of counterfeit crackers

In a bid to resolve the crisis of air pollution, Govt. of India has launched 'GREEN FIRE CRACKERS'.

The Union Minister for Science & Technology, Earth Sciences and Health and Family Welfare, Dr. Harsh Vardhan announced in a Press Conference in New Delhi, on October 5, 2019 that Council of Scientific and Industrial Research (CSIR) labs have been successful in developing various environment-friendly fireworks such as sound emitting Crackers, Flowerpots, Pencils, Chakkar and Sparklers.

He further pointed out that these fireworks, based on new formulations developed by CSIR, have been manufactured and are available in the Indian market for consumers and sellers.

He further informed that due to the ban that had been imposed as per the orders of Hon'ble Supreme Court of India, there was a threat of imminent closure of the entire fireworks industry.

However, Science has once again come to the rescue of the common man and millions of jobs have been saved due to the interventions made by our scientists.

Dr Harsh Vardhan said, "I am very happy that on one hand we would be using eco-friendly crackers this Deepawali, and, on the other hand our traditional festival celebrations with lights and fire crackers shall remain intact. Millions of homes which are dependent on sale and manufacture of fireworks will also rejoice this festival, thanks to our scientists!"

Dr. Harsh Vardhan also highlighted that the emissions testing facilities for the new fire crackers have been set up at CSIR-NEERI as well as their approved National Accreditation Board for Testing and Calibration (NABL) facilities whose list is available at CSIR NEERI website.

Further, a Raw Materials Compositional Analysis (RACE) facility has been launched in Sivakasi in Tamil Nadu to facilitate manufacturers for testing their raw materials and chemicals.

About 530 emissions testing certificates have been issued to fireworks manufactures for new and improved formulations meeting the stipulated guidelines of GREEN CRACKERS.

The Minister also lauded the efforts made by CSIR in developing these GREEN CRACKERS and informed that nearly 165 fireworks manufactures have been roped in and around 65 more manufacturers are in the process of coming on board.

To develop the reduced emission/green fireworks, eight labs participated, *CSIR-NEERI*, CEERI, IITR, IICT, NCL, CECRI, NBRI and CMERI, with CSIR NEERI coordinating the entire exercise.

Firstly, for immediate improvement CSIR-NEERI developed improvements in conventional formulations based on Barium Nitrate to meet the stipulated norms of GREEN CRACKERS.

The implementation of these formulations is subject to approval of Hon'ble Supreme Court of India. CSIR-NEERI has also developed new formulations for reduced emission light and sound emitting crackers with 30% reduction in particulate matter.

Dr Harsh Vardhan also mentioned that CSIR-NEERI along with Petroleum and Explosives Safety Organisation (PESO), Central Pollution Control Board (CPCB) and Ministry of Environment, Forests & Climate Change (MoEFCC) have also evolved a clear definition of green crackers with a view to educate the regulators and the public on ways and means to demarcate green crackers from conventional crackers.

Apart from defining GREEN CRACKERS, baseline values for benchmarking GREEN CRACKERS and assessing Barium levels in conventional crackers and GREEN CRACKERS, have been laid down for legal and policy interventions.

During the press conference, Dr Harsh Vardhan launched the GREEN CRACKERS manufactured by licensee-manufacturers.

He also informed that a Green Logo as well as a Quick Response (QR) coding system has been developed for differentiation of GREEN CRACKERS from conventional crackers.

QR codes is a novel feature incorporated on the fire crackers to avoid manufacture and sale of counterfeit products. This will also help the consumers to track the cracker using smart phones and other devices.

Dr Harsh Vardhan also indicated that the cost of the green crackers is almost same as that of regular crackers.

It is noteworthy to mention that Dr Harsh Vardhan had, in 2018, exhorted the Indian scientific community to initiate R&D on environment-friendly fireworks.

This was done to address not only the environmental concerns arising from use of existing fireworks but also protect the livelihoods of millions of people engaged in manufacture and sale of fireworks across the country.

The DG of CSIR, Dr. Shekhar C Mande; Director, NEERI, Dr. Rakesh Kumar and Dr. Sadhana Rayalu, NEERI were amongst those present at the Press Conference.

Background:

The Supreme Court had banned the sale, use and manufacture of crackers that weren't green in October 2018 due to concerns regarding the rising pollution levels.

The Apex Court had also restricted the time to burst crackers during Diwali as the National Capital Territory of Delhi had witnessed very poor levels of Air Quality after Diwali last year.

Under the Supreme Court order, the GREEN CRACKERS can't be loud beyond a limit and have to be free of Arsenic, Barium and Mercury.

The crackers also have to be approved by the Petroleum and Explosives Safety Organisation (PESO).

The Supreme Court had allowed the bulk manufacture of GREEN CRACKERS from May 2019, after CSIR got some samples approved by the PESO.

The helpline is available at: +918617770964 and +919049598046, or, email at: director@neeri.res.in.

GREEN BUILDING CONCEPT
-A MODERN WAY OF LIVING

Er.G.Jayarajan & Er.U.Indrajith/TANGEDCO

INTRODUCTION:

In the early days of mankind, the civilisation has developed along the river coursers. Sindhu valley civilisation in our country is an example of such a development along the river.

The basic need for any human being is food, clothes and shelter. Now the population in the world has crossed 7.4 billion crores.

Hence, it becomes a herculean task to provide shelter for the entire population with minimum damages to the environment and nature. Energy is vital for all activities.

WHERE DOES ENERGY COME FROM?

- 90% of the energy used in buildings comes from black coal fired power generation.
- Fossil fuel produces large amounts of CO2 emissions.

RENEWABLE ENERGY:

Globally, the following opportunities are available for making renewable energy Renewable Energy is the green energy with zero CO_2 emissions. Some of the sources are:

- Wind
- Hydro
- Solar
- Biomass
- Geothermal
- Ocean

Installing some of these can be most useful for energy efficiency and making the environment clean and cool. Solar lighting techniques are used for natural illumination of interiors, and will reduce reliance on artificial lighting systems.

The cost of LED lights is more expensive initially, but they are truly eco friendly and use very little energy. Unlike compact fluorescent lamps, they do not contain mercury and can be disposed properly.

The current consumption of lights are given below:

Type of bulb	Watts	Consumption/hour in unit	Cost of Savings
IC Bulb	60	0.060	0 %
CFL Bulb	13	0.013	45 %
LED LIGHT	8	0.008	74 %

HISTORY & DEVELOPMENT OF GREEN BUILDING:

In the past, the buildings were constructed with thick walls and more number of windows and open to sky area in the middle of the building for adequate cross ventilation and for rain water harvesting. Best examples for such buildings are Chettinadu and British buildings.

The increase of fuel costs in 1970's kindled the awareness and encouragement towards Green Buildings. Architects and ecologists started looking for solutions like reflective roofing materials, triple-glazed windows to achieve energy savings. But with the decrease of fuel prices, the Green movement was slowed down and was later in 1990's that the movement got kick start and awareness began for sustainable buildings.

WHAT IS ENVIRONMENTAL SUSTAINABILITY?

In 1987, the World Commission on Environment and Development defined sustainability as:

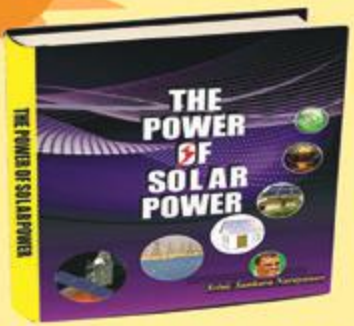
"Meeting the needs of the present without compromising the ability of future generations to meet their own needs."

GREEN BUILDING CONCEPT AND ARCHITECTURE PLANNING:

To have Green Building Concept, the following are to be considered:

1. Optimum use of Energy or power
2. Water conservation
3. Solid and Water Waste management, its treatment and reuse
4. Energy efficient transport systems
5. Efficient Building System Planning etc.

(To be continued...)



SOLARISING INDIA

The transition is not only necessary for the Planet's ecological survival, it's critical to the health and well being of every human

AUTHOR DETAILS

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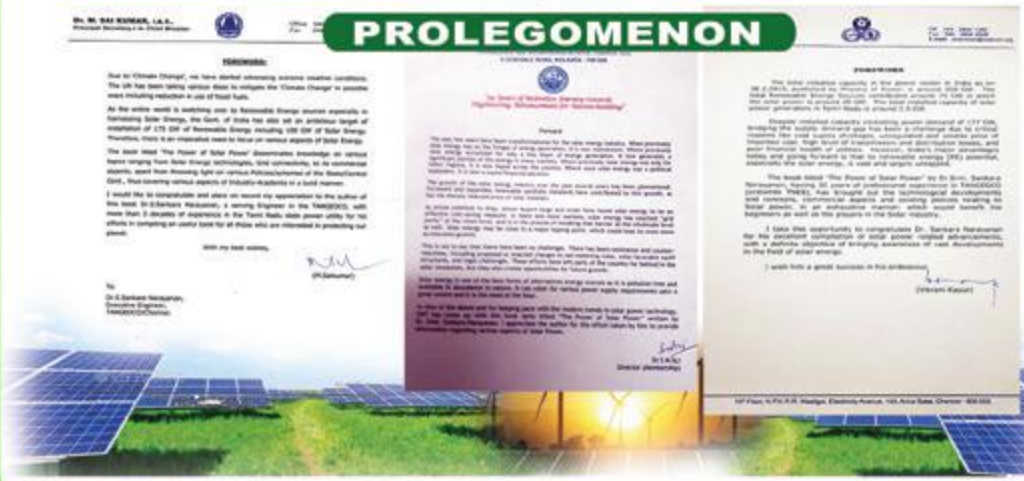
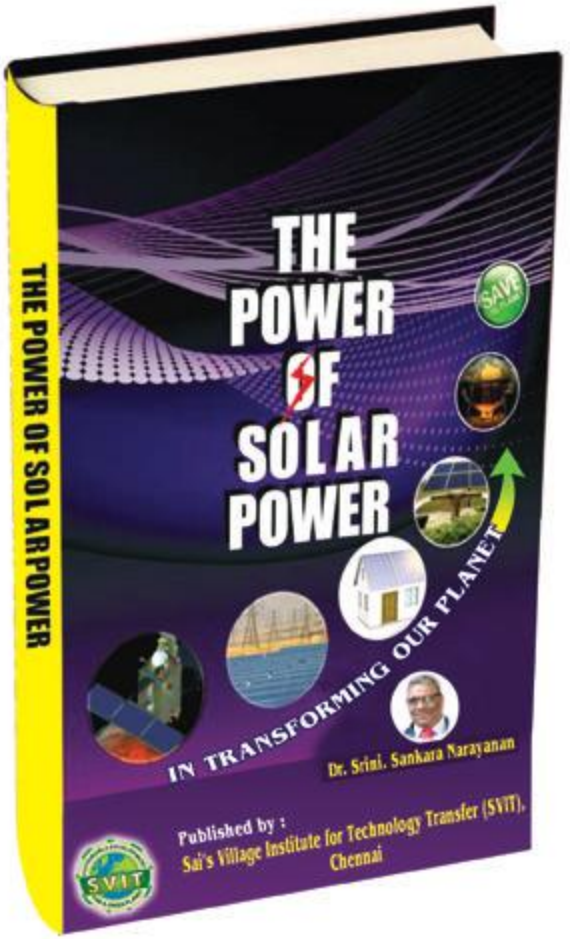
FROM THE DESK OF PIONEERS

PROLEGOMENON





THE GREEN ENERGY TODAY

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