TAMILNADU ELECTRICAL INSTALLATION ENGINEERS' ASSOCIATION 'A' GRADE

NEWSLETTER

ISSUE NO. 197	VOL NO. 19/2024	MONTHLY ISSUE NO. 4	PRIVATE CIRCULATION ONLY	AUGUST 2024

TAMILNADU ELECTRICAL INSTALLATION ENGINEERS' ASSOCIATION 'A' GRADE (Regn. No. 211/1992)
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GRAND FAMILY GET-TOGETHER 2024
TECHNICAL SEMINAR

on 28th, 29th, 30th June 2024 Kodai International, Kodaikanal

Inauguration - Lighting the Traditional Lamp

Magic Show - Childrens

Members Gatherings

Family Get-together - 2024 - Events

Family Get-together - 2024 - Events

Technical Seminar Inauguration - Lighting the Traditional Lamp

TNEIEA honouring the
M/s Shri Krishna Electrical Enginees & Traders, Chennai

TNEIEA honouring the
M/s. Bajaj Electricals Ltd., Chennai

TNEIEA honouring the
M/s PTS Powertronic Solutions Pvt Ltd., Chennai

Members Gatherings

EDITORIAL

Dear Members, Fellow Professionals and Friends,

Here is a small write-up on the importance of tree planting and its relationship to climate change:

Trees and Climate Change

Tree planting is a crucial component in the fight against climate change. As the Earth's climate continues to warm due to human-caused greenhouse gas emissions, trees play a vital role in mitigating the effects.

Trees are natural carbon sinks, meaning they absorb carbon dioxide (CO2) from the atmosphere and store it in their trunks, branches, leaves, and roots. As trees grow, they remove CO2 from the air, helping to reduce the overall concentration of this potent greenhouse gas. This process of carbon sequestration is essential for slowing the pace of global warming.

In addition to absorbing CO2, trees also provide other important benefits that contribute to a healthier climate. They release oxygen into the air, cool the surrounding environment through evapotranspiration, and help prevent soil erosion and land degradation. Healthy, thriving forests also support biodiversity, providing habitats for a wide range of plant and animal species.

By planting more trees and expanding forest cover, we can enhance the planet's natural ability to regulate the climate and mitigate the impacts of climate change. Tree-planting initiatives, both on a community and global scale, are valuable investments in a sustainable future.

We thank all those members who have helped us by participating in the advertisement appearing for the issue June 2024 – Pentagon Switchgear (P) Ltd., Sastinadha EPC Solutions India Pvt Ltd., 3SI Eco Power LLP., Power Cable Corporation, Sri Bhoomidurga Marketing (P) Ltd., Indoswiss Electricals & Enterprises, Gravin Earthing & Lightning Protection System (P) Ltd., VSP Power Solutions, E Power Engineering, Sinewaves Solutions India Pvt Ltd., Velan Infra Projects Pvt Ltd., Supreme Power Equipment Ltd., MV Power Consultants & Engineers (P) Ltd., Global EPC India Pvt Ltd., Galaxy Earthing Electrodes (P) Ltd., Sakthi Transformers.

EDITOR

TAMILNADU ELECTRICAL INSTALLATION ENGINEERS' ASSOCIATION 'A' GRADE

NEWSLETTER

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CONTENTS

UPDATED CENTRAL ELECTRICITY AUTHORITY (MEASURES RELATING TO SAFETY AND ELECTRIC SUPPLY) REGULATIONS, 2023 – 6

Chapter VI - Safety provisions for electrical installations and apparatus of voltage exceeding 650 V

Approval by the Electrical Inspector and self-certification

(1) (a) Every electrical installation of notified voltage and below shall be inspected, tested and self-certified by the owner or supplier or consumer, as the case may be, of the installation before commencement of supply or recommencement after shutdown for six months or more for ensuring observance of safety measures specified under these regulations and such owner or supplier or consumer, as the case may be , shall submit the report of self-certification to the Electrical Inspector in the forms as provided under Schedule II of these regulations:

Provided that the self-certified electrical installation shall be considered fit for the commencement of supply or recommencement after shutdown for six months only after the report of self-certification is duly received by the office of Electrical Inspector and if not acknowledged by the Electrical Inspector within three working days, it shall be deemed to be received:

Provided further that the owner or supplier or consumer, as the case may be, has the option to get his installation inspected and tested by the Electrical Inspector of the Appropriate Government;

(b) Notwithstanding anything contained in clause (a), every electrical installation covered under section 54 of the Act including every electrical installation of railways shall be inspected and tested by the Electrical Inspector of the Appropriate Government as specified in sub-regulation (3).

(2) The voltage above which inspection and testing of electrical installations including installations of supplier or consumer to be carried out by the Electrical Inspector, shall be notified by the Appropriate Government;

(3) Every electrical installation of voltage above the notified voltage and all the apparatus of the generating units above the capacity specified under regulation 34, shall be inspected and tested by the Electrical Inspector before commencement of supply or recommencement after shutdown for six months or more for ensuring observance of safety measures specified under these regulations.

(4) Before making an application to the Electrical Inspector for permission to commence or recommence supply in installations above the notified voltage after an installation has been disconnected for six months or more, the supplier shall ensure that electric supply lines or apparatus of more than notified voltage belonging to him are placed in position, properly joined, and duly completed and examined, and the supply of electricity shall not be commenced by the supplier for installations of voltage needing inspection under these regulations unless the provisions of regulations 14 to 31, regulations 35 to 37, regulations 46 to 53 and regulations 57 to 80 have been complied with and the approval in writing of the Electrical Inspector has been obtained by him:

Provided that the supplier may energise the aforesaid electric supply lines or apparatus for the purpose of tests specified in regulation 48.

(5) The owner of any installations of voltage above the notified voltage shall, before making application to the Electrical Inspector for approval of his installation or additions thereto, test every circuit or additions thereto, other than an overhead line, and satisfy himself that they withstand the application

of the testing voltage set out in regulation 48 and shall duly record the results of such tests and submit them to the Electrical Inspector:

Provided that the Electrical Inspector may direct such owner to carry out such tests, as he deems necessary or accept the certified tests of the manufacturer in respect of any particular apparatus in place of the tests required by this regulation.

(6) The owner of any installation who makes any addition or alteration to his installation shall not connect to the supply his apparatus or electric supply lines, comprising the said alterations or additions, unless and until such alteration or addition has been approved in writing by the Electrical Inspector or self-certified by the owner of the installation, as the case may be.

(7) In case of installations of mines and oil-fields, the electrical installations of voltage 650V and above shall not be connected to supply, unless and until such installation work including alterations or additions or recommencement after shutdown for six months are approved in writing by the Electrical Inspector of Mines:

Provided that the electrical installations of voltage below 650 V in mines and oil-fields are to be self-certified by the owned or agent or manager of the mine before commencement of supply or recommencement after shutdown for six months or more in the manner specified in sub-regulation (1).

Use of electricity at voltage exceeding 650 V

(1) The Electrical Inspector where the supply voltage exceeds the notified voltage shall not authorise the supplier to commence supply or recommence the supply, where the supply has been discontinued for a period of six months or more, or the supplier, where the supply voltage is equal to or below the notified voltage but exceeds 650 V, shall not commence supply or recommence the supply where supply has been discontinued for a period of six months or more, to any consumer unless, -

(a) All conductors and apparatus situated on the premises of the consumer are so placed as to be inaccessible except to the designated person;

(b) The consumer has provided and agreed to maintain a separate building or a locked weather proof and fire proof enclosure of agreed design and location, to which the supplier at all times shall have access for the purpose of housing his apparatus and metering equipment, or where the provision for a separate building or enclosure is impracticable, the consumer has segregated the aforesaid apparatus of the supplier from any other part of his own apparatus:

Provided that the segregation shall be made by the fire walls, if the Electrical Inspector considers it to be necessary;

Provided further that in the case of an outdoor installation the consumer shall suitably segregate the aforesaid apparatus belonging to the supplier from his own;

(c) All pole type substations are constructed and maintained in accordance with regulation 52.

(2) Where electricity at voltage exceeding 650 V is supplied, converted, transformed or used, the owner shall,

(i) Maintain safety clearances for electrical apparatus as per relevant standards specification so that sufficient space is available for easy operation and maintenance without any hazard to the operating and maintenance personnel working near the equipment and for ensuring adequate ventilation:

Provided that in case of mines, the safety clearances for electrical apparatus to be as per relevant mining regulations;

(ii) Not allow any encroachment below such installation:

Provided that where the Electrical Inspector comes across any such encroachment, he shall direct the owner to remove such encroachments;

(iii) Maintain minimum safety working clearances specified in Schedule V for the bare conductors or live parts of any apparatus in outdoor substations excluding overhead lines of installations of voltage exceeding 650 V;

(iv) Ensure that the live parts of all apparatus within the reach from any position in which a person may require to be, are suitably protected to prevent danger;

(v) Ensure that where the transformer is used, suitable provision shall be made, either by connecting with earth, a point of the circuit at the lower voltage or otherwise, to guard against danger by reason of the said circuit becoming accidentally charged above its normal voltage by leakage from or contact with the circuit at the higher voltage;

(vi) Not install a substation or a switching station with apparatus having more than 2000 litre of oil in the basement where proper oil draining arrangement cannot be provided;

(vii) Undertake the following measures, where a substation or a switching station with oil-filled apparatus, such as transformer, static condenser, switchgear or oil circuit breaker having more than 2000 litre of oil is installed, whether indoors or outdoors-

(a) The separation walls or fire barrier walls of thickness and dimensions as specified in the relevant standards shall be provided between the apparatuses and between the apparatus and adjacent building if building wall adjacent to the apparatuses is not rated for four hours' fire withstand rating;

(b) Provisions shall be made for suitable oil soakpit and where use of more than 9000 litre of oil in any one oil tank, receptacle or chamber is involved, provision shall be made for the draining away or removal of any oil which may leak or escape from the tank, receptacle or chamber containing the same, and special precautions shall be taken to prevent the spread of any fire resulting from the ignition of the oil from any cause and adequate provision shall be made for extinguishing any fire which may occur;

(c) Spare oil shall not be stored in the vicinity of any oil filled equipment in any such substation or switching station; and

(d) All the transformers and switchgears shall be maintained in accordance with the maintenance schedules prepared in accordance with the relevant standards;

(viii) Without prejudice to the above measures, undertake adequate fir detection and protection arrangement for quenching the fire of the apparatus;

(ix) Ensure that every transformer of 10 MVA or reactor of 10 MVAR and above rating shall be provided with automatic fire fighting system as per relevant standards;

(x) Undertake the following measures, where it is necessary to locate the substation, or switching station in the basement, namely:

(a) The transformer room be in the first basement at the periphery;

(b) The direct access to the transformer room be provided from outside and the surrounding walls of four hours' fire withstand rating be provided as per relevant standards;

(c) The entrances to the transformer room be provided with fire resistant doors of two hour fire rating and the door shall always be kept closed and a notice of this effect be affixed on outer side of the door;

(d) A curb of a suitable height be provided at the entrance in order to prevent the flow of oil from a ruptured transformer into other parts of the basement;

(e) The cables to primary side and secondary side have sealing at all floors and wall opening of at-least two hours' fire withstand rating; and

(f) Fire Retardant Low Smoke Low Halogen cable as per relevant standards be used;

(xi) Ensure that oil filled transformers installed indoors in other than residential or commercial buildings are placed on the ground floor or not below the first basement;

(xii) Ensure that only dry type transformer shall be used inside the residential and commercial buildings;

(xiii) Ensure that cable trenches inside the substations and switching stations containing cables are filled withstand, pebbles or similar non-inflammable materials or completely covered with non-inflammable slabs; and

(xiv) Ensure that unless the conditions are such that all the conductors and apparatus may be made dead at the same time for the purpose of cleaning or for other work, the said conductors and apparatus shall be so arranged that these may be made dead in sections, and that work on any such section may be carried on by the person designated or appointed or engaged or permitted under these regulations without danger.

(To be continued)

Courtesy: https://cea.nic.in/

BRITISH INTERNATIONAL INVESTMENT BULLISH ON INDIAN EV ECOSYSTEM, EXPECTS TO INVEST USD 300MN IN 3 YRS: MD ABHINAV SINHA

Synopsis

Abhinav Sinha of British International Investment envisions India surpassing China in EV adoption by 2030, ahead of Europe and the US, driven by government support and cost considerations, emphasizing the country's potential for significant growth in electric transportation.

UK's development finance institution, is betting big on the Indian electric vehicles ecosystem and expects to invest another USD 300 million in the next three years, according to its MD and Head of Technology & Telecoms, Abhinav Sinha. The company, which has backed Mahindra group's electric vehicles (EV) arm besides other start-ups like Euler Motors, Turno and Battery Smart, has already invested around USD 300 million in the Indian EV sector and sees further investment opportunities in EV manufacturing components and financing segments in the country.

India has quite an evolved auto market... On the EV side, the penetration right now lags the rest of the world... The (overall) penetration of EVs in India is something like 6 per cent and we see it quite easily expand, double and more than double quite quickly," Sinha told PTI in an interview.

He further said, "the leader today is China, but for India to be significantly ahead of where it is today... we think it's a very achievable sort of an objective... So we're quite bullish."

Sinha was responding to a query on how British International Investment (BII) sees the **EV ecosystem** in India compared to the other markets in the world and investment opportunities in the country.

By 2030, he said there will be a "massive level" of EV penetration in public transportation in India and there will be "quite a bit of traction on the passenger (electric) cars, as more and more people adopt it".

"I would imagine even if it's not as much as China, it'll be ahead of Europe and the US in the way it's going and all the push coming from the government as well as the logic of total cost of ownership," Sinha said.

On BII's investments in India, he said, "We have invested (USD) 300 million so far in this whole EV space... we've backed Mahindra in India, on their EV platform and that's a very significant investment for us, almost USD 250-million."

Moreover, it has also made investments in Euler Motors, a startup commercial EV manufacturer, Turno, an EV distribution and financing for small businesses and individuals and Battery Smart, a battery-swapping network for electric two- and three-wheelers.

When asked about BII's further investment plans in the Indian EV ecosystem, Sinha said, "It's hard to say an exact number but we have invested USD 300 million over the last three years and I would expect a similar sort of pace going forward."

On the strategy for future investments, he said, "What we realised is that a lot of focus has to go on earlier stage investments and these tend to be smaller, even though the number of our typical sizes in these spaces are like USD 5 million to USD 10 million investments. Maybe the numbers may not stack up quite a bit initially but as these companies become bigger we then follow with another investment."

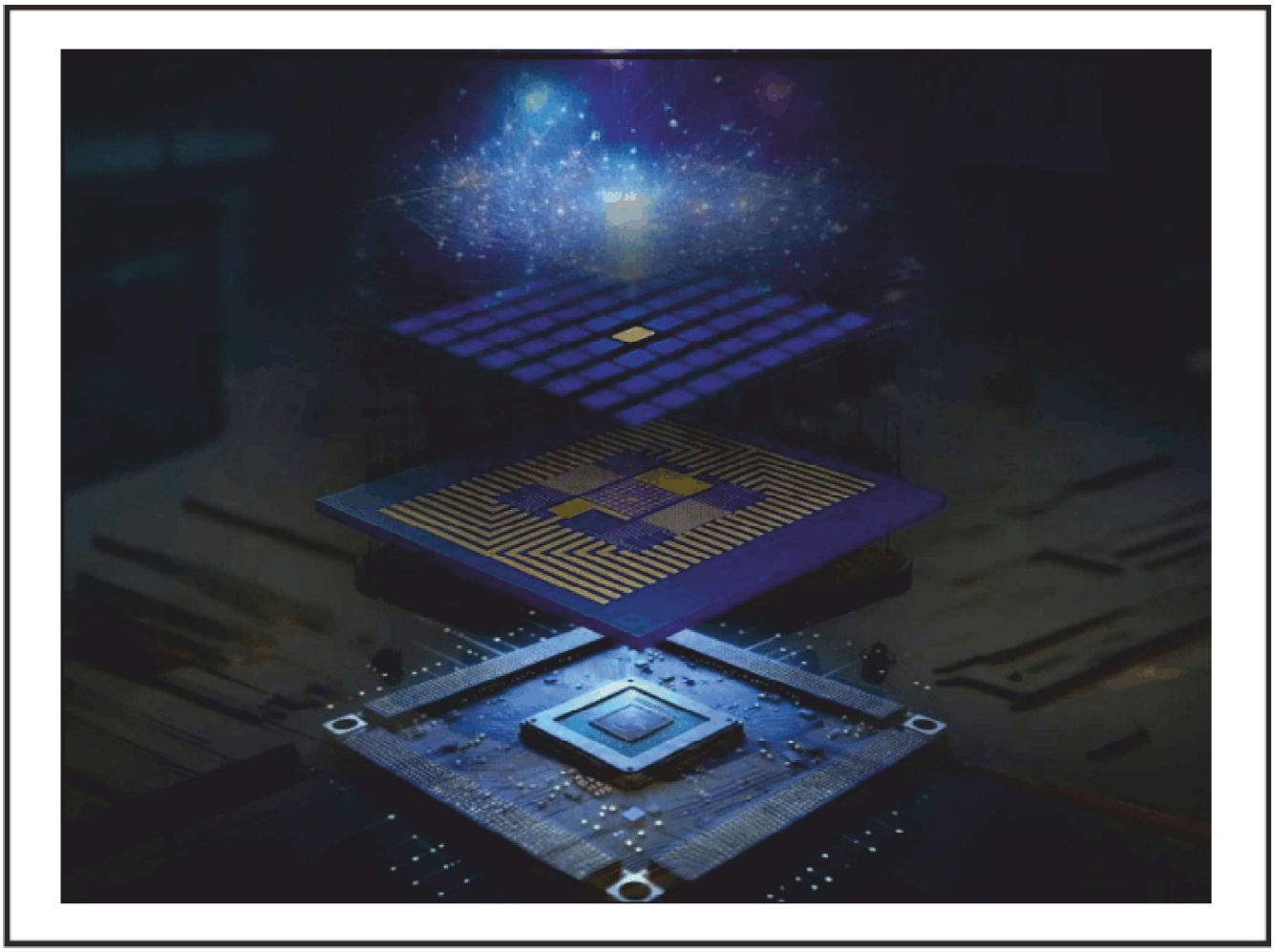
For BII in India, he said climate in general has the highest attention and within that "EV is probably going to be the largest area for us to invest."

"So, we will continue investing in the manufacturing side and we will extend that in the components and the financing side. It is a space which will take a lot of investment. We will invest across the entire value chain," Sinha said.

Courtesy: The Economic Times, dt. 23.06.2024

MIT'S DIAMOND QUBITS RE-DEFINE THE FUTURE OF QUANTUM COMPUTING

Researchers developed a modular fabrication process to produce a quantum-system-on-chip that integrates an array of artificial atom qubits onto a semiconductor chip. Credit: Sampson Wilcox and Linsen Li, RLE, edited



A new quantum-system-on-chip enables the efficient control of a large array of qubits, advancing toward practical quantum computing.

Researchers at MIT and MITRE have developed a scalable, modular quantum hardware platform, incorporating thousands of qubits on a single chip, promising enhanced control and scalability. Utilizing diamond colourcenters, this new architecture supports extensive quantum communication networks and introduces an innovative lock-and-release fabrication process to efficiently integrate these qubits with existing semiconductor technologies.

Quantum Computing Potential

Imagine being able to quickly solve extremely complex problems that might take the world's most powerful supercomputer decades to crack. This is the promise of quantum computers.

However, realizing this capability requires constructing a system with millions of interconnected building blocks called qubits. Making and controlling so many qubits in a hardware architecture is an enormous challenge that scientists around the world are striving to meet.

Advancements in Quantum Hardware

Toward this goal, researchers at MIT and MITRE have demonstrated a scalable, modular hardware platform that integrates thousands of interconnected qubits onto a customized integrated circuit. This "quantum-system-on-chip" (QSoC) architecture enables the researchers to precisely tune and control a dense array of qubits. Multiple chips could be connected using optical networking to create a large-scale quantum communication network.

By tuning qubits across 11 frequency channels, this QSoC architecture allows for a new proposed protocol of "entanglement multiplexing" for large-scale quantum computing.

Innovative Quantum Chip Manufacturing

The team spent years perfecting an intricate process for manufacturing two-dimensional arrays of atom-sized qubit microchiplets and transferring thousands of them onto a carefully prepared complementary metal-oxide semiconductor (CMOS) chip. This transfer can be performed in a single step.

"We will need a large number of qubits, and great control over them, to really leverage the power of a quantum system and make it useful. We are proposing a brand new architecture and a fabrication technology that can support the scalability requirements of a hardware system for a quantum computer," says Linsen Li, an electrical engineering and computer science (EECS) graduate student and lead author of a paper on this architecture.

Li's co-authors include Ruonan Han, an associate professor in EECS, leader of the Terahertz Integrated Electronics Group, and member of the Research Laboratory of Electronics (RLE); senior author Dirk Englund, professor of EECS, principal investigator of the Quantum Photonics and Artificial Intelligence Group and of RLE; as well as others at MIT, Cornell University, the Delft Institute of Technology, the U.S. Army Research Laboratory, and the MITRE Corporation. The paper was published recently in *Nature*.

Unique Properties of Diamond Colour Centers

While there are many types of qubits, the researchers chose to use diamond colour centers because of their scalability advantages. They previously used such qubits to **produce integrated quantum chips** with photonic circuitry.

Qubits made from diamond colour centers are "artificial atoms" that carry quantum information. Because diamond colour centers are solid-state systems, the qubit manufacturing is compatible with modern semiconductor fabrication processes. They are also compact and have relatively long coherence times, which refers to the amount of time a qubit's state remains stable, due to the clean environment provided by the diamond material.

In addition, diamond colour centers have photonic interfaces which allows them to be remotely entangled, or connected, with other qubits that aren't adjacent to them.

"The conventional assumption in the field is that the inhomogeneity of the diamond colour center is a drawback compared to identical quantum memory like ions and neutral atoms. However, we turn this challenge into an advantage by embracing the diversity of the artificial atoms: Each atom has its own spectral frequency. This allows us to communicate with individual atoms by voltage tuning them into resonance with a laser, much like tuning the dial on a tiny radio," says Englund.

Quantum Communication and Control Challenges

This is especially difficult because the researchers must achieve this at a large scale to compensate for the qubit inhomogeneity in a large system.

To communicate across qubits, they need to have multiple such "quantum radios" dialled into the same channel. Achieving this condition becomes near-certain when scaling to thousands of qubits. To this end, the researchers surmounted that challenge by integrating a large array of diamond colour center qubits onto a CMOS chip which provides the control dials. The chip can be incorporated with built-in digital logic that rapidly and automatically reconfigures the voltages, enabling the qubits to reach full connectivity.

"This compensates for the in-homogenous nature of the system. With the CMOS platform, we can quickly and dynamically tune all the qubit frequencies," Li explains.

Lock-and-Release Fabrication

To build this QSoC, the researchers developed a fabrication process to transfer diamond colour center "microchiplets" onto a CMOS backplane at a large scale.

They started by fabricating an array of diamond colour centre microchiplets from a solid block of diamond. They also designed and fabricated nanoscale optical antennas that enable more efficient collection of the photons emitted by these colour center qubits in free space.

Then, they designed and mapped out the chip from the semiconductor foundry. Working in the MITnano cleanroom, they post-processed a CMOS chip to add microscale sockets that match up with the diamond microchiplet array.

They built an in-house transfer setup in the lab and applied a lock-and-release process to integrate the two layers by locking the diamond microchiplets into the sockets on the CMOS chip. Since the diamond microchiplets are weakly bonded to the diamond surface, when they release the bulk diamond horizontally, the microchiplets stay in the sockets.

"Because we can control the fabrication of both the diamond and the CMOS chip, we can make a complementary pattern. In this way, we can transfer thousands of diamond chiplets into their corresponding sockets all at the same time," Li says.

The researchers demonstrated a 500-micron by 500-micron area transfer for an array with 1,024 diamond nanoantennas, but they could use larger diamond arrays and a larger CMOS chip to further scale up the system. In fact, they found that with more qubits, tuning the frequencies actually requires less voltage for this architecture.

"In this case, if you have more qubits, our architecture will work even better," Li says.

Future Prospects and Performance Testing

The team tested many nanostructures before they determined the ideal microchiplets array for the lock-and-release process. However, making quantum microchiplets is no easy task, and the process took years to perfect.

"We have iterated and developed the recipe to fabricate these diamond nanostructures in MIT cleanroom, but it is a very complicated process. It took 19 steps of nanofabrication to get the diamond quantum microchiplets, and the steps were not straightforward," he adds.

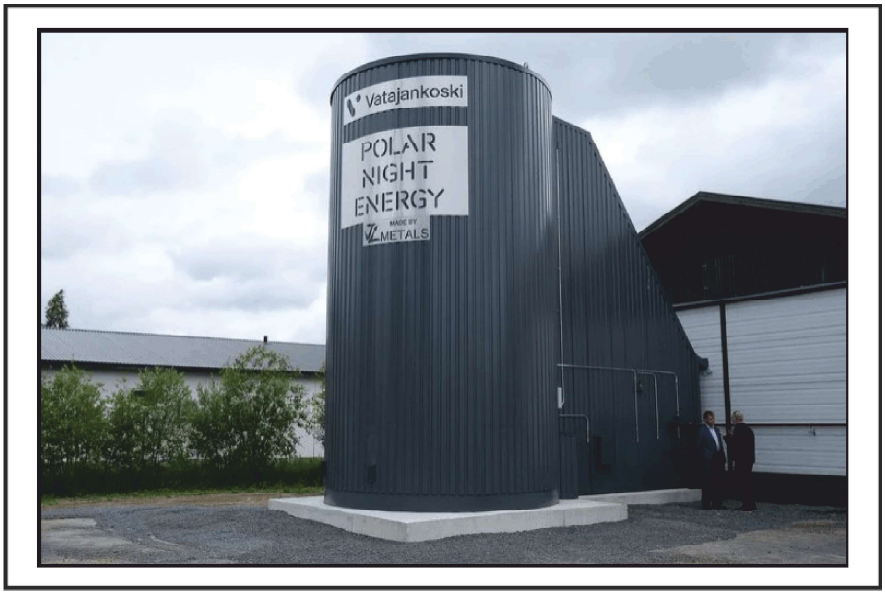
Alongside their QSoC, the researchers developed an approach to characterize the system and measure its performance on a large scale. To do this, they built a custom cryo-optical metrology setup.

Using this technique, they demonstrated an entire chip with over 4,000 qubits that could be tuned to the same frequency while maintaining their spin and optical properties. They also built a digital twin simulation that connects the experiment with digitized modelling, which helps them understand the root causes of the observed phenomenon and determine how to efficiently implement the architecture.

In the future, the researchers could boost the performance of their system by refining the materials they used to make qubits or developing more precise control processes. They could also apply this architecture to other solid-state quantum systems.

Courtesy: https://scitechdaily.com/mits-diamond-qubits-redefine-the-future-of-quantum-computing

SAND BATTERIES: A PROMISING SOLUTION FOR ENERGY STORAGE



As the world continues to grapple with the increasing demand for renewable energy, the search for innovative and efficient energy storage solutions has become a crucial priority. One promising technology that has gained significant attention in recent years is the sand battery.

The sand battery, also known as a thermal energy storage system, is a unique approach to storing energy that utilizes the abundant and readily available resource of sand. The basic concept behind a sand battery is to use sand as a medium to store thermal energy, which can then be released and converted into electricity when needed.

The process works as follows: Excess electricity generated from renewable sources, such as solar or wind power, is used to heat the sand to high temperatures, typically ranging from 500 to 900 degrees Celsius. This heated sand is then stored in an insulated container, effectively acting as a thermal battery. When the stored energy is required, the heat from the sand is used to generate steam, which in turn drives a turbine to produce electricity.

One of the key advantages of sand batteries is their potential for long-term energy storage. Unlike lithium-ion batteries, which are commonly used for short-term storage, sand batteries can store energy for extended periods without significant energy loss. This makes them an attractive option for balancing the intermittency of renewable energy sources and ensuring a more reliable and consistent power supply.

Moreover, sand batteries offer several other benefits that make them a promising solution for energy storage. They are relatively inexpensive to construct, as sand is a widely available and low-cost material. Additionally, sand batteries are inherently safe, as they do not rely on volatile or hazardous materials, reducing the risk of explosions or fires.

Despite the promising nature of sand battery technology, there are still some challenges that need to be addressed before widespread adoption. Improving the overall efficiency of the system, optimizing the heat exchange processes, and developing cost-effective scalability are some of the key areas that researchers and engineers are currently exploring.

As the world continues to transition towards a more sustainable energy future, the sand battery represents a compelling and innovative approach to energy storage. With its potential for long-term storage, safety, and cost-effectiveness, the sand battery could play a crucial role in supporting the growth of renewable energy and contributing to a cleaner, more resilient energy landscape.

HARMONICS IN POWER SYSTEM & MITIGATION - 7

Reduction factor for Harmonic Currents in four core & five core cable as per IEC 60364 -5-52

REDUCTION FACTOR

% content of 3rd harmonic	Size based on Ph current	Size based on Neutral Ct
0-15	1.0	-
15-33	0.86	-
33-45	-	0.86
➢ 45	-	1.0*

- If the neutral current is more than 135% of Ph current & the cable size is selected on the basis of neutral current than 5 ph conductor will not be fully loaded
- The reduction in heat generated by the neutral conductor to the extend that is not necessary to apply any reduction factor to the current carrying capacity of the three loaded connection

Example

Load current 37A

Cable Size 4 x 6 sq.mm cu

Current carrying capacity of cable = 40A

CASE -1

20 % of 3rd harmonic present

Reduction Factor - 0.86

Designed load alters to 37/.86 = 43 A, needs 10 sq.mm cu cable

CASE -2

40% 3rd harmonic present

Reduction factor 0.86 based on Neutral

(ie) 37 x 0.4 x 3 /0.86 = 44.4/0.86= 51.624 A
10sq.mm sufficient

CASE - 3

50% 3rd harmonic present

Reduction Factor 1.0 based on Neutral

(ie) 37 x 0.5 x 3 / 1.0 = 55.1 A
16 Sq.mm cable suitable

In this case the use of a special protective device (Compact NSX equipped) with trip for instance would allow the use of 6sqmm cable for 3 phases & 10 sq.mm cable for neutral

Current THD - R (RISK)

Current THD-R is the percentage of the RMS Value of Harmonic currents of ranks greater than 1 in the relation to the RMS value of fundamental plus harmonic current

THD-R (CURRENT)	COMMENTS
<10%	Low harmonic current, Little risk of disturbance
10% < THD-R < 50%	Risk of heat rise, over sizing of conductor required
50% < THD – R	High harmonic current. Risk of Disturbance Immediate rectification required
THD -R (Voltage)	
< 5%	Insignificant Distortion
5% < THDV < 8%	Significant distortion. Risk of Heat Rise & Disturbance
8% < THDV	Significant Distortion. High RISK

(to be continued)

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SAFELY AND SECURELY MANAGING PANDALS - PART-1

An introduction to this article:

It is now the period of festivities – starting with Ganesh Chathurthi, Navrathri, Christmas etc. Public display of gods and deities, entertainment programs invite more people to visit the venues.

These venues called 'Pandals' – a term accepted in National Building Code are assembled in urgency and hence safety and security are given the go-by thereby risking life and property. In addition, stampede is a known tragedy in such situations.

We engineers are called to verify the safety of the Pandals or by our own interest and to secure safety inspect such temporary premises knowing fully well that several electrical, fire, structural collapse accidents have happened in the past in such temporary tenements.

The purpose of this document is to enable our engineers to have a brief checklist of Safety and Security Systems so that they can better assess and improve the same.

Our National Building Code has given lot of useful guidance on the civil, structural, electrical, fire, lighting, banner installations etc.

We all as Engineers would like some strong backing for our suggestions given and some authoritative document to enforce the same.

In this regard, some excerpts of recommendations in the NBC 2016 are indicated. Please complement the excerpts below with additional recommendations from NBC, other codes and best engineering practices and make the occasions a more joyous and complete one.

Bharat Mata Ki Jai.

EXTRACTS FROM NBC 2016

Definition of a 'Building' in National Building Code and exclusion of 'Pandals' from being called 'Buildings'

2.9 Building — Any structure for whatsoever purpose and of whatsoever materials constructed and every part thereof whether used as human habitation or not and includes foundation, plinth, walls, floors, roofs, chimneys, plumbing and building services, fixed platforms, VERANDAH, balcony, cornice or projection, part of a building or anything affixed thereto or any wall enclosing or intended to enclose any land or space and signs and outdoor display structures.

Tents/ SHAMIANAHS/PANDALS, tarpaulin shelters, etc, erected for temporary and ceremonial occasions shall not be considered as a 'building'.

6.4.2.1.a Exit door width for assembly buildings shallnot be less than 2.0 m.

6.4.2.1.J No display or exhibit shall be so installed oroperated as to interfere in any way with access to anyrequired exit, or with any required exit sign.

6.4.2.1.K All displays or exhibits of combustible material orconstruction and all booths and temporary constructionin connection therewith shall be so limited incombustibility or protected as to avoid any unduehazard of fire which might endanger occupants beforethey have opportunity to use the available exits, asdetermined by the authority.

8758 : 2013 Code of practice for fireprecautionary measures inconstruction of temporarystructures and pandals (secondrevision).

Soliciting of Temporary Occupancy:

13.2.1 *Temporary Occupancy* - Upon the request of the holder of the permit, theAuthority may issue a temporary certificate of occupancy for a building or part thereof, before theentire work covered by permit shall have beencompleted, provided such portion or portions may beoccupied safely prior to full completion of buildingwithout endangering life or public welfare.

3.2.5 PART 4 *Temporary Buildings or Structures - 3.2.5.1* Temporary buildings and structures shall bepermitted only in Fire Zones No. 1 and 2 as the casemay be, according to the purpose for which these areto be used, by

special permit from the Authority for alimited period and subject to such conditions as maybe imposed in the permit.

3.2.5.2 Such buildings and temporary structures shallbe completely removed on the expiry of the periodspecified in the permit.

3.2.5.3 Adequate fire precautionary measures in theconstruction of temporary structures and *PANDALS*shall be taken in accordance with good practice

2.1.28 PART 6 – STRUCTURAL DESIGN

Structure, Temporary — Structures which areerected for a short period, such as hutments at projectsites, for rehabilitation, temporary defenceconstructions, exhibition structures, etc.

EXTRACTS FROM NBC 2005

19 STABILITY OF THE STRUCTURE

20.1 A structure or structural element required to havefire resistance should be designed to possess anappropriate degree of resistance to flame penetration;heat transmission and failure. The fire resistance of astructural element is expressed in terms of time in hoursin accordance with good practice. Fireresistance of concrete elements depends upon detailsof member size, cover to steel reinforcement detailingand type of aggregate (normal weight or light weight)used in concrete. General requirements for fireprotection are given in good practice.

19.1 Overturning

The stability of a structure as a whole againstconcrete members so as to have the required fireoverturning shall be ensured so that the restoringresistance shall be moment shall be not less than the sum of 1.2 times themaximum overturning moment due to the characteristicdead load and 1.4 times the maximum overturningmoment due to the characteristic imposed loads. Incases where dead load provides the restoring moment,only 0,9 times the characteristic dead load shall beconsidered. Restoring moment due to imposed loadsshall be ignored.

19.1.1 The anchorages or counterweights provided foroverhanging members (during construction andservice) should be such that static equilibrium shouldremain, even when overturning moment is doubled.

23.1 Temporary Electrical Wiring

23.1.1 Frayed and/or bare wires shall not be used fortemporary electrical connections during construction.All temporary wiring shall be installed and supervisedby a competent electrician. Adequate protection shallbe provided for all electrical wiring laid on floor whichmay have to be crossed over by construction machineryor by the workmen. All flexible wiring connecting theelectrical appliances shall have adequate mechanicalstrength and shall preferably be enclosed in a flexiblemetal sheath. Overhead wires/cables shall be so laidthat alley leave adequate head room.

26.4.3.2 *Lighting*

Good lighting is necessary in order that maintenancework can be carried out satisfactorily. This isparticularly important in confined spaces. Whenthe normal lighting is inadequate it should besupplemented by temporary installations. Theseshould provide general and spot illumination asappropriate.

E-6 Before removing the covers and connections, allcovers and cable terminations should be marked toensure correct replacements. Disturbed connectionsand temporary connections should be marked tofacilitate re-connection. Temporary connections andmarkings should be removed before the installation isput to use.

3.3 **Coordination with Local Supply Authority**

a) In all cases, that is, whether the proposedelectrical work is a new installation orextension of an existing one, or a modificationinvolving major changes, the electricitysupply undertaking shall be consulted aboutthe feasibility, etc, at an early date.

b) Addition to an Installation — An addition,temporary or permanent, shall not be madeto the authorized load of an existinginstallation, until it has been definitelyascertained that the current carrying capacityand the condition of existing accessories,conductors, switches, etc, affected, includingthose of the supply authority are adequate forthe increased load. The size of the cable/conductor shall be suitably selected on thebasis of the ratings of the protective

devices.Ratings of protective devices and their typesshall be based on the installed load, switchingcharacteristics and power factor.

6.9.2 *PVC ClampslPVC Channel*

Link clips had been the common system for wiring onwooden batten, which is now phased out. PVC clamps/PVC channel shall conform accepted standards. Theclamps shall be used for temporary installations of 1-3sheathed wires only. The clamps shall be fixed on wallat intervals of 100 mm in the case of horizontal runsand 150 mm in the case of vertical runs.

PVC channel shall be used for temporary installationsin case more than 3 wires or wires or unsheathed wires.The channel shall be clamped on wall at intervals notexceeding 300 mm.

5.2.4.1 Extract

When applyitig the provision of thesetables for providing the number of fixtures,consideration sh~ be given to the accessibilityof the fixtures. Using purely numerical basismay not result in an installation suited to theneed of a specific building. For example,schools should be provided with toiletfacilities on each floor. Similarly toiletfacilities shall be provided for temporaryworkmen employed in any establishmentaccording to the needs; and in any case oneWC and one washbasin shall be provided.

2.1.30 *Temporary Sign* — An advertising sign, banneror other advertising device constructed of cloth, canvas,fabric or any other light material, with or without astructural frame, intended for a limited period ofdisplay; including decorative displays for holidays orpublic demonstrations.

15 **TEMPORARY ADVERTISING SIGNS,TRAVELING CIRCUS SIGNS, FAIR SIGNSAND DECORATIONS DURING PUBLICREJOICING**

15.2.2 The advertisement contained on any such signshall pertain only to the business, industry or otherpursuit conducted on or within the premises on whichsuch sign is erected or maintained. Temporaryadvertising signs shall be removed as soon as tom ordamaged and in any case within 14 days after erectionunless extended.

15.2.3 The Authority shall be empowered to orderthe immediate removal of any temporary advertisingsign or decoration, where, in its opinion such actionis necessary in the interests of public amenity andsafety.

15.2.6 *Maximum Size*

Temporary signs shall not exceed 10 m2 in area.

15.2.8 *Special Permits*

All temporary banners suspended from building orhung on poles, which exteryi across streets or otherpublic spaces shall be subject to special approval ofthe Authority.

A HAPPY NOTE:

Have given extracts of both NBC 2005 and NBC 2016 for reference in case our safety auditors have either.

P.S. If we type 'Temporary' in the NBC, more useful information can be retrieved!!

In next part we will see some checklist as well.

Wishing a great festival season to all.

Thanks and warm regards

Mr. Muthukrishnan Kalyanasundaram, M.E.

Proprietor – M/s HKM ENGINEERS AND CONSULTANTS

Services – Fire and Life Safety Consultancy

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(Son of Mr. H. Kalyanasundaram – Ex. Best and Crompton Engineering Limited)

SOLAR TECHNOLOGY:INNOVATIVE LIGHT-HARVESTING SYSTEM WORKS VERY EFFICIENTLY

In order to convert sunlight into electricity or other forms of energy as efficiently as possible, the very first step is an efficient light-harvesting system. Ideally, this should be panchromatic, i.e. absorb the entire spectrum of visible light.

The light-collecting antennae of plants and bacteria are a model for this.

They capture a broad spectrum of light for photosynthesis, but are very complex in structure and require many different dyes to transmit the energy of the absorbed light and focus it on a central point.

The light-harvesting systems developed by humans to date also have disadvantages:

Although inorganic semiconductors such as silicon are panchromatic, they only absorb light weakly.

In order to absorb enough light energy, very thick layers of silicon in the micrometre range are therefore required — making solar cells relatively bulky and heavy.

Organic dyes that are suitable for solar cells are much thinner: their layer thickness is only around 100 nanometres.

However, they are barely able to absorb a broad spectral range and are therefore not particularly efficient.

Thin Layer Absorbs a Lot of Light Energy

Researchers at Julius-Maximilians-Universität (JMU) Würzburg in Bavaria, Germany, in the journal *Chem* have now presented an innovative light-harvesting system that differs significantly from previous systems.

"Our system has a band structure similar to that of inorganic semiconductors. This means that it absorbs light panchromatically across the entire visible range. And it uses the high absorption coefficients of organic dyes. As a result, it can absorb a great deal of light energy in a relatively thin layer, similar to natural light-harvesting systems," says JMU chemistry professor Frank Würthner.

His team from the Institute of Organic Chemistry / Center for Nanosystems Chemistry designed the light-harvesting system at JMU and investigated it together with Professor Tobias Brixner's group from the Institute of Physical and Theoretical Chemistry.

Four Dyes in an Ingenious Arrangement

Put simply, the innovative light-harvesting antenna from Würzburg consists of four different merocyanine dyes that are folded and thereby stacked closely together.

The elaborate arrangement of the molecules enables ultra-fast and efficient energy transport within the antenna.

The researchers have given the prototype of the new light-harvesting system the name URPB.

The letters stand for the light wavelengths that are absorbed by the four dye components of the antenna: U for ultraviolet, R for red, P for purple, B for blue.

Proven Performance Via Fluorescence

The researchers have demonstrated that their novel light-collecting system works so well by measuring the so-called fluorescence quantum yield.

This involves measuring how much energy the system emits in the form of fluorescence.

This allows conclusions to be drawn about the amount of light energy that it has previously collected.

The result: the system converts 38 per cent of the irradiated light energy over a broad spectral range into fluorescence — the four dyes on their own, on the other hand, manage less than one per cent to a maximum of three per cent. The right combination and skilful spatial arrangement of dye molecules in the stack therefore make a big difference.

Courtesy: https://www.sciencedaily.com/releases/2024/06/240626152221.htm

INDIA'S SOLAR SHARE IN JUNE 2024 AT 7.1% FROM 5.8% IN 2023

A new report by energy think tank Ember predicts that solar electricity generation will reach 20% on June 21, up from 16% last year. KostantsaRangelova, an electricity analyst at Ember, emphasizes the rapid growth of solar power globally.

BATHINDIA: The electricity generation in the world through solar will reach 20% on June 21 midday peak on the summer solstice (the day when the sun reaches its maximum or minimum declination, marked by the longest and shortest days on June 21 and December 22), up from 16% last year. Finds a new report by energy think tank ember, realised on Thursday.

In June solar generation typically has a seasonally higher share due to the longer summer days in the northern hemisphere, where Ember estimates 89% of the world's solar panels are installed. The report finds that the share of solar in total electricity generation to reach 8.2% in June 2024, up from 6.7% in June 2023. Across the whole of 2023, solar generated 5.5% of global electricity.

The report expects China's share of solar in total electricity generation to reach 9.6% in June 2024, up from 7% in June 2023. On average, for the year 2023, solars' share in China electricity generation was 6.2%.

In the EU, solar share across June is expected to be more than double the global average at 20%, up from 17% in June 2023. On average, for the entire year 2023, the EU's solar share was 9.2%.

India is expected to have a solar share in June 2024 at 7.1% below the global average of 8.2 %.

The share on average across 2023 was 5.8% in India.

At 20% share, solar is now a serious global electricity source. Battery costs have collapsed, meaning solar power is already being used in the evening solar power is already being used in the evening, not just in the daytime. Solar power is the fastest growing source of electricity and will undoubtedly rise to become the biggest source of electricity and ultimately of energy", said KostantsaRangelova, electricity analyst at Ember.

The analysis shows that there are now 34 economies that generated more than 10% of their electricity from solar in 2023. Although China is by far the biggest installer of solar panels, its share in 2023 was well below this threshold, at 6.2%. However, 66% of countries still generate less than 5% of their electricity from solar, including many with insolation above the global average. Considering the falling costs and increase in technological efficiency, solar is set to see increased adoption in these countries in future.

Courtesy: The Time of India, dt. 22.06.2024

HOW TO MAXIMISE YOUR ELECTRIC VEHICLE'S BATTERY LIFESPAN: TIPS AND TRICKS

Synopsis

Maximizing the lifespan of EV batteries is crucial for cost-effectiveness and environmental sustainability. Essential tips include avoiding deep discharges, regular use, and proper charging practices.

As electric vehicles (EVs) become increasingly popular, maximizing the lifespan of their batteries is crucial for both cost-effectiveness and environmental sustainability. Here are some essential tips and tricks to ensure your EV battery remains in optimal condition for as long as possible.

Avoid Deep Discharges

One of the key factors in preserving your EV battery's lifespan is to avoid deep discharges. Leaving your battery discharged for extended periods can accelerate degradation. It's essential to recharge your battery before it gets critically low. Ideally, aim to keep the charge level above 20% to maintain the battery's health.

Regular Use

Lithium-ion (Li-ion) batteries, which power most EVs, perform best when used regularly. Maintaining a state of charge (SOC) between 20% and 80% is ideal for longevity. This range helps balance the battery's chemistry, preventing stress that can lead to premature aging. Regular use and maintaining an optimal SOC can significantly extend your battery's useful life.

Avoid Extreme Temperatures

Li-ion batteries are sensitive to temperature extremes. They perform optimally within a moderate temperature range, and exposure to excessive heat or cold can degrade their performance and lifespan. If you live in a region with extreme temperatures, consider using climate control features in your EV to keep the battery within a safe temperature range. For long-term storage, aim to store the battery at around 50% SOC in a cool, dry place to prevent capacity loss.

Charge Properly

Using the right charger and following manufacturer recommendations is critical. Not all chargers are created equal, and using an inappropriate one can harm your battery. Always use the charger specified by the EV manufacturer and follow the provided instructions. This ensures that the battery is charged efficiently and safely, reducing the risk of damage.

Inspect for Physical Damage

Regular inspections for physical damage are crucial for maintaining battery health. Look out for signs such as cracks, leaks, or any other visible damage. Physical damage can compromise the battery's integrity and lead to safety hazards. If you detect any damage, have the battery inspected by a professional immediately to avoid further complications.

Driving Habits

Your driving habits have a significant impact on your EV battery's lifespan. Smooth driving, avoiding unnecessary acceleration and braking, helps reduce the strain on the battery. Aggressive driving not only consumes more power but also generates more heat, both of which can accelerate battery wear. Adopting a more moderate driving style can help in maintaining the battery's health over the long term.

Regular Inspections

Regular inspections and timely maintenance are essential to keep both the vehicle and its battery in good condition. Follow the manufacturer's recommendations for service intervals and get your vehicle inspected as advised. These inspections can identify potential issues early and ensure that any necessary maintenance is performed promptly, preventing minor problems from becoming major ones.

In conclusion, maximizing your electric vehicle's battery lifespan requires a combination of mindful usage, proper charging practices, regular maintenance, and cautious driving habits. By following these tips, you can ensure that your EV battery remains in good health, providing reliable performance and extending its lifespan, which ultimately contributes to the sustainability and cost-effectiveness of your electric vehicle. Taking these steps not only benefits you financially but also supports broader environmental goals by reducing the need for frequent battery replacements.

Courtesy: The Economic Times

INDIA'S ELECTRIC VEHICLE JOURNEY

The debate over **Electric Vehicles (EVs)** in India is complex, involving considerations of **emissions, cost, and policy.** While EVs are often touted as zero-emission vehicles, experts point out that in India, where 75% of electricity comes from coal, the **lifecycle emissions of EVs may actually be higher than those of internal combustion engine (ICE) vehicles** or hybrids in some cases.

Some argue that **hybrid vehicles,** with their smaller battery packs and improved fuel efficiency, may currently offer a better balance of emissions reduction and cost-effectiveness in the Indian context. The debate also touches on the role of **government subsidies and policies** in shaping the automotive market.

Looking ahead, the future of EVs in India appears promising, with **increasing adoption in two-wheeler and three-wheeler segments**, ongoing improvements in battery technology, and the government's push for cleaner transportation.

What are Electric Vehicles?

- **About**: Electric vehicles are a type of vehicle that use one or more electric motors for propulsion, instead of a **traditional internal combustion engine (ICE)** that burns gasoline or diesel.
  - Though the concept of electric vehicles has been around for a long time, it has drawn a considerable amount of interest in the past decade amid a **rising carbon footprint and other environmental impacts of fuel-based vehicles.**
- **Types of Electric Vehicles:**
  - Battery Electric Vehicles (BEVs): Solely rely on battery power for propulsion and produce zero tailpipe emissions.
  - **Plug-in Hybrid Electric Vehicles (PHEVs):** Combine an electric motor with a gasoline engine. They can be charged externally and run on battery power for a limited range, then switch to the gasoline engine for longer journeys.
  - **Hybrid Electric Vehicles (HEVs**): Use both an electric motor and a gasoline engine, but the battery cannot be charged directly by plugging in.
    - The battery is charged by the gasoline engine or **through regenerative braking**.
- **Benefits of EVs:**
  - **Reduced Emissions**: Produce zero tailpipe emissions, contributing to cleaner air and improved public health.
  - **Lower Operating Costs**: Electricity can be cheaper than gasoline, leading to lower fuel costs per kilometer.
  - **Quieter Operation**: Electric motors generate significantly less noise compared to gasoline engines.
  - **Improved Efficiency**: Electric motors convert a higher percentage of energy into usable power compared to gasoline engines.
- **EV Policies in India:**
  - **2010:** India incentivizes EVs through a Rs. 95-crore scheme by the Ministry of New and Renewable Energy (MNRE), offering up to **20% incentives on ex-factory prices.** Withdrawn in **March 2012.**
  - **2013:** Launch of '**National Electric Mobility Mission Plan (NEMMP) 2020**' to boost EV adoption, address energy security, and reduce vehicular pollution. Largely remained unimplemented.
  - **2015**: Union Budget announces **FAME scheme** with a Rs. 75 crore outlay to incentivize clean-fuel technology cars, **targeting 7 million EVs by 2020.**

- **2017:** Indian Transport Ministry aims **for 100% electric cars by 2030.** Plan scaled down to **30% after industry concerns.**
- **2019:** Union Cabinet approves **Rs. 10,000-crore FAME-II scheme** to accelerate EV adoption with upfront purchase incentives and charging infrastructure.
- **2023:** The 36th GST Council Meeting decided to **reduce the GST rate on electric vehicles from 12% to 5%** and chargers or charge stations from **18% to 5%** to boost the electric vehicle market.
- **2024**: Centre has recently proposed a **New Electric Vehicle Policy that is currently** under consultation.

What are the Environmental Benefits of EV Adoption?

- **Reducing Air Pollution**: In India, vehicular traffic is responsible for 27% of total air pollution and causes 1.2 million deaths annually. The adoption of electric vehicles (EVs) in India will thus significantly mitigate the negative environmental impacts associated with Internal Combustion Engine (ICE) vehicles.
- **Reducing Noise Pollution:** Noise pollution is a significant issue in India, exacerbated by rapid urbanization and increased vehicle use. According to a 2022 UNEP report, five Indian cities are among the world's noisiest. While the report cites various sources, EVs can help lower noise levels since they lack the mechanical valves, gears, and fans found in ICE vehicles.
- **Improving Operational Efficiency:** In terms of fuel efficiency, petrol or diesel cars convert only 17 to 21% of stored energy, whereas EVs can convert 60% of electrical energy from the grid. This transition to electric vehicles in India will enhance the efficiency of fuel usage and optimization, reducing operational costs for end-users and increasing the demand for EVs.

What are the Major Challenges Related to Electric Vehicle Adoption in India?

- **High Cost of EVs:** Compared to an **internal combustion engine (ICE)** car, a similar electric car can be significantly more expensive.
  - For instance, a **Tata Nexon starts at around Rs 8.10 lakh,** while the Nexon EV starts at **Rs 14.74 lakh.**
  - This high upfront cost is a major deterrent for many potential EV buyers, particularly in a price-sensitive market like India. Government subsidies can help bridge the gap, but their effectiveness can be limited.
- **Limited Charging Infrastructure**: India's charging infrastructure for EVs is still in its early stages of development.
  - While the number of charging stations is increasing, **they are concentrated mainly in major cities.**
  - This lack of widespread charging facilities creates "**range anxiety" for potential EV owners,** who fear running out of power before finding a charging station.
- **Lack of Robust Local Battery Manufacturing Ecosystem:** India heavily relies on imported **Lithium-ion batteries**, a crucial and expensive EV component
  - India imports them from **China, Japan, and South Korea**. In 2022, it imported 617 million units of lithium-ion batteries for **USD 1.8 billion.**
- **Grid Dependence and Emissions**: India's electricity grid **heavily relies on coal-fired power plants.**
  - While EVs produce **zero tailpipe emissions,** charging them with electricity generated from fossil fuels contributes to overall emissions.
  - The environmental benefit of EVs depends on the **cleanliness of the electricity** grid. Until India significantly increases its renewable energy capacity, **the true environmental benefit of EVs might be limited.**

- **Skill Gap in EV Maintenance:** EVs require a different skill set for maintenance and repair compared to traditional ICE vehicles.
  - The **current Indian automotive workforce i**s not adequately equipped to handle the complexities of EV technology.
- **Apprehensions on Adaptation for Indian conditions:** India's extreme temperatures, in summers often exceeding 40°C in many regions, can significantly **impact the performance of electric vehicles.**
  - Studies have shown that **EV range can decrease by up to 17%** in temperatures above 35°C.
- **Recycling and Sustainability Concerns:** Lithium-ion batteries used in EVs require proper disposal or recycling due to the presence of rare earth elements and other potentially hazardous materials.
  - India currently **lacks a robust system for EV battery recycling.** Improper battery disposal can pose environmental risks.
- **Range Anxiety:** It refers to the fear or uncertainty of running out of battery charge while driving. Many consumers worry about the limited range of EVs and the potential inconvenience of finding charging stations for long journeys.
  - Although the range of EVs has been improving, it remains a concern for consumers, especially in a country with vast distances like India and continuously improved Highway Infrastructure.

What Measures can be Adopted to Accelerate EV Adoption in India?

- **"Battery Lease-to-Own" Program:** Implementing a government-backed scheme where EV buyers only purchase the **vehicle chassis, leasing the battery long-term**.
  - As battery technology improves, **lessees can upgrade to newer models at reduced costs.**
  - At the end of the lease term, users can buy out the battery or **return it for recycling.**
  - This could reduce initial EV costs by up to 40%, making them more competitive with ICE vehicles.
- **Invest in Battery Technology**: Current batteries are small and have low voltage capacities, limiting their ability to enhance EV propulsion and extend travel distances.
  - To tackle this issue, private companies need to innovate by developing batteries made of lightweight materials with higher energy density, and capable of being charged using renewable sources.
  - The Government is also promoting the manufacturing of batteries in India with the National Mission for Transformative Mobility and Battery Storage, 2019.
    - Such schemes should be leveraged to promote technological enhancement in the battery segment.
- **Increase Charger Density:** According to the Confederation of Indian Industry (CII), India needs over 1.3 million chargers by 2030. To encourage EV adoption, we must significantly increase the number of charging stations.
  - **Charge as You Park:** Transforming parking meters in urban areas **into EV charging points.** This leverages existing infrastructure and creates a vast network of charging options without significant additional investment.
  - Standardization: The government, in collaboration with EV ecosystem players and auto OEMs, should prioritize establishing standardization protocols, ensuring interoperability, and promoting the development of fast-charging technologies.
- **EV Rural Entrepreneurs" Program:** Enabling rural individuals to set up and operate small-scale EV charging stations from their village or small businesses.
  - Provide micro-loans and technical support for setting up standardized charging points.
  - Implementing a **mobile app for users to locate and book these charging points.**

- Operators can earn income from charging fees, creating new economic opportunities.

- **Highway Battery Swap Corridors:** Establishing a network of standardized battery swap stations along major highway routes.
  - **Partnering with dhaba owners to host these stations,** providing them additional income.
  - Creating an **online reservation system for swap slots** to minimize wait times during peak travel.
- **Equal Subsidies to EVs and Hybrids:** The government should consider treating **EVs and hybrids equally for subsidies**, as both technologies offer significant environmental benefits.
  - Policies should be dynamic and adapt to the evolving landscape, focusing on **lifecycle emissions and total cost of ownership.**
  - This approach ensures efficient use of resources and supports India's transition to a greener transport system while meeting climate and energy security goals.
- **Second-Life Battery Bazaar**: Creating a vibrant **"Second-Life Battery Bazaar".** This online or physical marketplace connects individuals and businesses with used batteries suitable for **repurposing in low-powered applications like rickshaws, solar storage, or even powering village microgrids.**
  - Investing in research and development of **innovative "urban mining" techniques**. These techniques can extract valuable **lithium, cobalt, and nickel from electronic waste**, including old batteries, phones, and laptops.
  - It will reduce electronic waste, create new economic opportunities, and promote a **circular EV ecosystem.**

Courtesy: https://www.drishtiias.com/daily-updates/daily-news-editorials/india-s-electric-vehicle-journey

HUMOUR

Three lawyers and three engineers were travelling by train to a conference. At the station, each lawyer bought a ticket whereas the engineers bought only one ticket between them.

'How are you going to travel on a single ticket?' asked a lawyer.

'Wait and watch', answered one of the engineers.

When they boarded the train, the lawyers took their seats, but the three engineers crammed into a toilet and closed the door behind them. Shortly after the train started, the ticket collector arrived. He knocked on the toilet door and asked, "Ticket, please." The door opened just a crack and a single arm emerged with a ticket in hand. The ticket collector took it and moved on.

Seeing this, the lawyers decided to the same thing on the return trip so when they arrived at the station they bought only one ticket. To their astonishment, the engineers didn't buy any. 'How are you going to travel without a ticket?' asked one of the perplexed lawyers.

"Wait and watch", answered an engineer.

In the train, the three engineers crammed into a toilet and the three lawyers into another nearby. Soon after the train started, one of the engineers got out of the toilet and walked to one where the lawyers were hiding.

He knocked on the door and said, "Ticket, please…"

My luck is so bad that if I bought a cemetery, people would stop dying. - *Rodney Dangerfield*

Money can't buy you happiness .... But it does bring you a more pleasant form of misery. - *Spike Milligan*

Until I was thirteen, I thought my name was SHUT UP. - *Joe Namath*

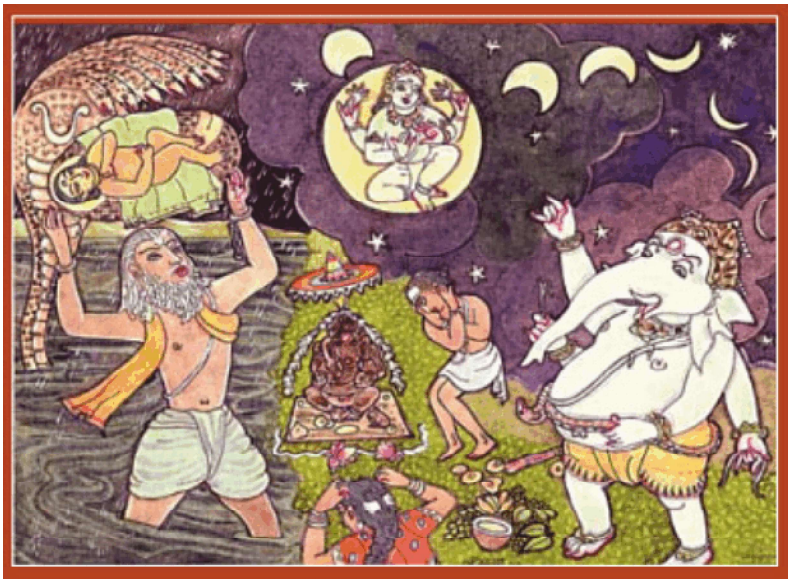
The secret of a good sermon is to have a good beginning and a good ending; and to have the two as close together as possible - *George Burns*

Santa Claus has the right idea. Visit people only once a year. - *Victor Borge*

Be careful about reading health books. You may die of a misprint. - *Mark Twain*

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 at right 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 centre 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.

HOME FESTIVALS - 9

புரட்டாசி - Purattasi (September/October)

Navaratri ("nine nights") is the principal festival this month. The Goddess is worshipped in Her many forms, and on the ninth day, Sarasvati (centre of the painting) is invoked to bless musical instruments, account books, agricultural instruments and home tools (upper left). On Vijaya Dasami, the day following Navaratri, Goddess Durga is invoked as children are given their first instruction, worship their school books and honour their teacher. A decorated display of dolls is displayed through the nine days, then dismantled and stored on the tenth day. **Vijaya Dasami is also the birthday of Lord Venkateshwara**, presiding Deity of Tirupati temple in Andhra Pradesh, India's wealthiest temple.

(To be continued)

Grand Family Get-together - 2024 @ Kodaikanal
Members Gatherings

Printed and Published by 'Tamilnadu Electrical Installation Engineers' Association"A" Grade, Chennai - 15.
Editor : G.M. Vishnuram