KINGS COLLEGE OF ENGINEERING AUTONOMOUS

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ISTE STAFF CHAPTER (TN 205)

ACADEMIC YEAR 2024-25(EVEN SEMESTER)

Staff Seminar Report

A one day seminar titled "**Recent Trends in Solar PV application"** was organized by **ISTE Staff Chapter [TN 205]** on **05.05.2025** from 3.00p.m. to 3.45p.m. to the faculty members of Kings College of Engineering (Autonomous) with an objective to offer a better understanding of Recent Trends in Solar PV application. The session was handled by the resource person **Dr.L.Maheswari,** Assistant Professor / Department of Electrical and Electronics Engineering**.**

The solar photovoltaic (PV) industry in 2024 is experiencing significant advancements, driven by technological innovations, evolving market dynamics, and supportive policy frameworks. Here's an overview of the key trends shaping the sector:

1. Technological Innovations

- **Perovskite-Silicon Tandem Cells**: Companies like Quells have achieved a world record efficiency of 28.6% in large-area silicon solar cells with perovskite layers. This breakthrough promises higher energy yields and reduced land requirements for solar installations
- **Bifacial Solar Panels**: These panels capture sunlight from both sides, increasing energy production by up to 30%. Their adoption is growing, especially in utility-scale projects, due to their enhanced efficiency and cost-effectiveness.
- **Flexible and Lightweight Solar Panels**: Advancements have led to the development of ultra light, flexible solar panels that can be integrated into various surfaces, from clothing to vehicles, expanding the potential applications of solar energy.

2. Emerging Applications

- **Agrivoltaics**: The integration of solar panels with agricultural activities is gaining momentum. In the U.S., over 500 agrivoltaic sites contribute 9 GW of solar capacity, demonstrating the dual benefits of renewable energy generation and sustainable farming practices.

- **Floating Solar Farms**: Installing solar panels on bodies of water, such as reservoirs and lakes, addresses land scarcity issues and offers additional benefits like reduced water evaporation and improved water quality.
- **Solar Carports**: These structures provide shaded parking spaces while generating solar energy, supporting electric vehicle (EV) charging infrastructure and contributing to sustainable urban development.

3. Digitalization and Smart Integration

- **Smart Inverters and IoT Integration**: The incorporation of smart inverters and Internet of Things (IoT) technologies allows for real-time monitoring and optimization of solar energy systems, enhancing efficiency and enabling predictive maintenance.
- **Artificial Intelligence (AI) and Machine Learning (ML)**: AI and ML are being utilized to optimize solar panel design, placement, and maintenance, improving system performance and facilitating better integration with the electrical grid

4. Policy and Market Dynamics

- **India's Domestic Manufacturing Push**: In a bid to reduce reliance on imports, India mandates that from June 2026, all clean energy projects must use solar PV modules made from locally-produced cells. This policy aims to bolster domestic manufacturing capabilities and support the country's renewable energy targets.
- **Global Growth and Emission Reductions**: In 2023, a record 456 GW of PV capacity was installed globally, with China contributing 277 GW. By early 2024, over 1.6 TW of PV systems were operational, producing 2,136 TWh of electricity and reducing 0.92 gigatons of CO_2 emissions, underscoring solar energy's pivotal role in the transition to a sustainable energy future.
- In conclusion, 2024 marks a transformative year for solar PV, characterized by technological breakthroughs, innovative applications, and supportive policies. These developments not only enhance the efficiency and versatility of solar energy systems but also pave the way for a more sustainable and decentralized energy landscape.

Totally 14 faculty members actively participated in this session and gained knowledge about the Recent Trends in Solar PV application. The seminar was arranged by **Mrs.T. Gnanajeya**, Coordinator / ISTE Chapter.

	
Resource Person's Talk	***Audience listening the seminar***

Coordinator / ISTE Chapter 7/5/25

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