



e-NEWSLETTER, DEC. '19

CLEAN ENERGY



INSIDE THIS ISSUE:

ENERGY INNOVATION

Nanoscale Energy Harvester Micro Solar Dome

ENERGY ACADEMIA

School of Energy Science & Engineering Researcher Magazine

EXPERTS SPEAK Clean Energy Dialogue

BIOENERGY

Waste to Energy Silk BioMechanical Energy Microwave for Biofuel CSR Award Winner

NUCLEAR ENERGY COLLABORATION Fast Breed Reactors

ELECTRIC VEHICLE

Indigenous 3-Wheeler

POLICY REVIEW

Risk Perceptions for Green Lighting Pradhan Mantri Ujjwala Yojana

> ENERGY IDEATION @YIP2019



From the Editor's Desk:

The world is becoming a smaller place but with increasing needs thus requiring to exploit our natural resources a little more to meet our demands for the next few hours. But how much more and for how long? The worst affected has been our environment including flora and fauna. Of course there are more - our next generation, our own health and wellbeing, quality of life. The United Nations General Assembly in 2015 had identified seventeen areas which need urgent and empathetic attention. Termed Sustainable Development Goals these could be a 'blueprint to achieve a better and more sustainable future for all'. India and many other countries are addressing several of these goals through national mission policies and even engaging industries through setting them as target areas for corporate social responsibility (CSR) programmes.

At IIT Kharagpur, six thrust areas have been adopted based on the expertise of the researchers to address the challenges in the common path towards achievement of such goals and offer technological solutions. The IIT KGP Researcher which is launched as the monthly e-Newsletter from December 2019 will bring forward activities related to Research & Development, national mission and collaborative projects conducted by the Institute primarily in these areas in addition to other R&D and innovative work being carried out. In the launch issue we have chosen the theme of Affordable and Clean Energy Solutions (UN SDG - 7) leading to positive impact on Climate Change (UN SDG - 13).

We invite you for dialogue in these areas and contribute to the projects through your association and network. Several of these projects require funding for scaling up and implementation. So join our evangelism for India & the Earth. Write to us at media@iitkgp. ac.in. You can also donate online.

ENERGY INNOVATION

NanoScale Energy



Indian scientists have the reputation of innovating unique solutions to global challenges befitting the key factors of affordability and resource availability. In one such feat, researchers from IIT Kharagpur have ventured into the avenue of clean energy generation in an unexampled way of sourcing electricity from the drying of clothes in open space by Nanoscale Energy Harvesting. They successfully guided the movement of saline water amidst continuous evaporation quite analogous to water transport across the parts of a living plant. The device design inherently exploits a large transpiration surface for achieving a sustainable motion of salt ions, through natural evaporation phenomenon.

READ FULL STORY

Micro Solar Dome



What if you power devices can not only light up your house but earn you a living too? Researchers from IIT Kharagpur and NBIRT are working towards this goal for marginalized sections in India. A Micro Solar Dome project is being implemented by IIT Kharagpur to provide cheap, clean energy to the marginalized sections and also empower them by creating an economy towards installation and maintenance of such domes and strenthen the social space through improved community interaction and quality of lives.

BIOENERGY

Waste to Energy

Municipal Solid Waste with high moisture content and its disposal has been a matter of concern for tropical locations. But thanks to researchers at IIT Kharagpur, now it can not only disposed off but converted to bioenergy with zero wastage using Hydro Thermal Carbonization. Through the process, most of the mixed Municipal Solid Waste can be converted into biofuel, soil amendment and absorbents.

READ FULL STORY



Silk to BioMechanical Energy

Microwave for Biofuel



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READ FULL STORY



decades For several experts have been discussing the potential of non-edible plant based biofuel for use in transportation sector. However, challenge for large scale production is the chemical composition and structure of the materials. Researchers from IIT Kharagpur's P K Sinha Center for Bioenergy have exacted the issue through the use of microwave radiation. The team from the Bioenergy Lab at the Dept. of Chemical Engineering has successfully converted non-edible lignocellulosic fibres of Sunn Hemp to biofuel precursors, and that too completing the entire conversion – in only 46 minutes using the microwave reactors in the lab.

BIOENERGY AWARD WINNER



Funded by National Backward Classes Finance & Development Corporation under their CSR program, IIT Kharagpur has set up fifteen bio-gas plants in the village Bhemua, 10 No. Gram Panchayat, in the vicinity of IIT Kharagpur in 2017. The project has been awarded Excellence Award by National Backward Classes Finance & Development Corporation for efficient implementation of clean energy in several backward villages through CSR funding.

<image>

IIT Kharagpur lived up to the 'Make in India' challenge by launching Deshla, prototype of a fully indigenous next-gen electric auto, on September 11. The vehicle was designed and built from scratch by Electric Vehicle Group (EVG) of the Institute. Deshla, when commercialized, is bound to give the makers of both Totos (e-rickshaws) and autos a run for their money for the rare combination it has been able to produce. With its powerful motor, lithium ion battery that can last up to 6-7 years, high load carrying capacity, sturdy frame and yet easy manoeuvrability, Deshla is a better option than diesel-guzzling, polluting autos and even the flimsy and high-maintenance Totos. It is not only clean and green, but it also steals a march on both when it comes to the issues of safety, reliability, performance, and comfort.

NUCLEAR ENERGY COLLABORATION



Indira Gandhi Centre for Atomic Research, Kalpakkam and IIT KGP come together to collaborate on R&D support towards the development of fully indigenous Fast Breeder Reactors. A dedicated IGCAR-IITKGP R&D cell has been set up under an MoU in the premises of IIT Kharagpur under the Advanced Technology Development Centre's Structural Reliability Research Facility of IIT KGP to address the key issues in software and systems reliability, safety and security, health monitoring, materials and manufacturing.

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EARCHER

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ENERGY POLICY REVIEW



The Pradhan Mantri Ujjwala Yojana is aimed to safeguard the health of women and children by providing 5 crore LPG connections. However, there have been several practical difficulties in the implementation of the program. The decision support system of IIT Kharagpur could help the Pradhan Mantri Ujjwala Yojana maximize LPG connections in BPL households. This approach is first of its kind for analysis of a national level energy policy. It uses mixed integer linear programming to mathematically formulate the policy using input parameters, decision variables and their relationships.

Risks Challenging LED Lighting



Are perceived risks making Indians shy away from eco-friendly LED lighting? – Researchers at IIT Kharagpur's Vinod Gupta School of Management find concurrence in a study pointing out at consumer psychology and perceived high-cost factor which might be slowing down the growth of the Indian LED lighting market.

READ FULL STORY

EXPERTS SPEAK

Clean Energy Dialogue



PK Sinha Center for Bioenergy and Renewables at IIT Kharagpur organized the DBT National Workshop on Bioenergy (DNWB 2019) in Kolkata on October 17-18, 2019. Funded by the Department of Biotechnology, Government of India, this workshop brought together bioenergy scientists from around the country to promote a national conversation on and solve technological challenges towards achieving the national mission of deploying clean energy to fight climate change. The workshop offered a rare opportunity to DBT's five Bioenergy Centers, namely, the DBT-Pan IIT Center for Bioenergy, the DBT-ICGEB Center for Bioenergy, the DBT-IOCL Center, the DBT-TERI Center for Bioenergy, and the DBT-ICT Center for Energy Biosciences, to come together and discuss their bioenergy research, exchange new ideas, and collaborate towards building a renewable energy future for India.

ENERGY IDEATION @YIP2019



Children's environmental concerns find voice at Young Innovators Program

Greta Thunberg can take heart. The theme of 'Energy and Environment' received top billing at IIT Kharagpur's Young Innovators Program 2019, with a majority of the participating school students electing to find their own ways to combat pollution and promote conservation. In its third edition, the contest drew students from Classes VIII-X from schools all over India and abroad to brainstorm on the themes of Health and Cleanliness, Hardware Modelling, Product Designing, Disaster Management, Financial Inclusion, as also Energy and Environment. The grand finale of YIP was held at the IIT Kharagpur campus over three days ending on November 10, 2019.

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Thrust Areas: Solar Photo Voltaic, Solar Thermal, Bio energy, Smart Grid, Hybrid system

Research Facilities: Bio-Energy Laboratory, Electrical System Laboratory, Energy Storage Laboratory, Microgrid Laboratory

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