SDG7: AFFORDABLE AND CLEAN ENERGY

Government Support for Affordable Clean Energy in India:

Renewable Energy Programs: The Indian government emphasizes the development and utilization of renewable energy sources like solar, wind, and hydroelectric power to reduce reliance on traditional fossil fuels.

Subsidies and Incentives: Various subsidies and incentives are offered to promote the use of clean energy technologies, making them more accessible and affordable for both industries and households.

National Solar Mission: The initiative aims to increase solar energy capacity, encouraging solar power generation and reducing dependence on conventional energy sources.

UPES University's Use of Clean Affordable Energy:

Campus Renewable Energy Initiatives: UPES integrates renewable energy sources within its campus infrastructure, utilizing solar panels, wind turbines, and other clean energy technologies to power its facilities.

Education and Research: The university emphasizes education and research in the field of renewable energy, empowering students and researchers to develop innovative solutions for affordable and sustainable energy practices.

Community Engagement: UPES conducts outreach programs and workshops, educating the community about the benefits and applications of clean energy, promoting its use in local households and businesses.

Future Goals and Impacts:

UPES University's commitment to utilizing clean and affordable energy aligns with the government's initiatives. By expanding renewable energy integration, fostering research, and promoting community awareness, UPES can significantly contribute to a more sustainable energy landscape in the region.

In summary, while the Indian government is dedicated to promoting affordable clean energy, UPES University's integration of renewable energy sources, education, and community engagement stands as a pivotal force in advocating and applying clean, affordable energy practices for a sustainable future.

Centre for Alternate Energy Research (CAER)

https://research.upes.ac.in/centre-for-alternate-energy-research-caer/

Providing safe, widespread, and equitable access to sustainable energy is one of the key challenges of our time. Centre for Alternate Energy Research (CAER) UPES, hosts world-leading researchers who see this challenge as an opportunity to help future generations inherit a better world. Our interdisciplinary program brings together innovators from many departments, including the School of Applied Science, School of Engineering, School of Health Sciences and School of Business.

We are working on different alternative energy resources using advanced technology. Currently, we are working on biofuel production from waste agricultural and forest biomass by thermal and biological routes, plastic waste to energy and other value-added products, microalgae biofuels. CAER actively seek national and global collaboration with industry, academia and all levels of government and private bodies.

List of equipment at CAER

- Solar Thermal Pyrolysis reactor (15 Kg/batch)
- Digital pyrolysis reactor (50 Kg/batch)
- Lab scale floating type Biogas production plant (6-80 m3 / day)
- Pilot scale CSTR Biogas plant (40 m3/day)
- Algae Photobioreactor
- Open ponds
- Vacuum Oven
- Hot plate magnetic stirrer
- Heating mantle
- Chirpine grinder
- Refrigerator
- Centrifuge
- Fuel Combustion and Emissions analysis set up
- Solar cooker
- Emission analysis kit of cooking stove
- Soxhlet extraction Unit

- Hydrothermal Liquefaction reactor
- Gasification Reactor (Downdraft gasifier, 15 Kg/ atch)
- Briquetting Machine
- Municipal solid waste segregator
- Screw press expeller
- Hot air Oven
- Lab scale Biodiesel reactor (1, 5 and 100 L/ batch)
- Plastic shredder machine
- Muffle furnace
- Vacuum Oven
- Hot plate magnetic stirrer
- Heating mantle
- Chirpine grinder
- Refrigerator
- Centrifuge
- Fuel Combustion and engine Emissions analysis set up
- Multifuel cooking stove

Workshop on "Advances in materials and battery technology for electric vehicles"

https://research.upes.ac.in/2022/05/10/workshop-on-advances-in-materials-and-battery-technology-for-electric-vehicles/

The center for Interdisciplinary research (CIDRI) , UPES , Dehradun, organized a one day workshop which focused on Industry –Academia collaboration on the topic – Advances in materials and battery technology for electric vehicles. This workshop was organized as a part of the project titled "Study, education, and training of students in environment sustainability and clean energy technologies for solid state battery application" which has been sponsored by Ornate Solar Pvt Ltd., New Delhi.

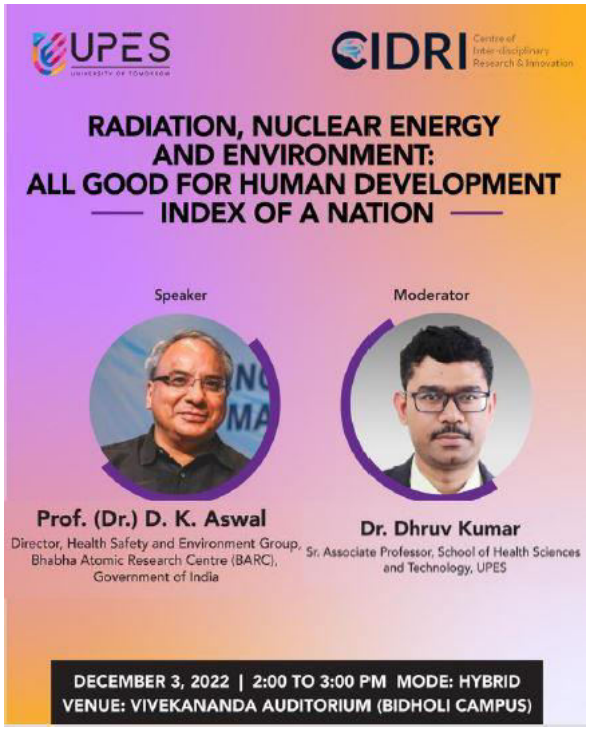
This workshop was started after inauguration and welcome address by Dr. D.K. Awasthi and then it was presided over by Dr. Sunil Rai, vice-chancellor, UPES. Then there was an address by Prof. A. C Pandey who was the chief guest of the workshop.

This workshop comprised of many Keynote addresses by experts and academicians such as Prof. Vijayamohanan K Pillai (IISER-Tirupati) , Prof. B. K . Panigrahi (Professor, Department of Electrical Engineering, IIT Delhi) and industry representatives such as Mr. Aditya Goel (Director, Ornate Solar Pvt Ltd, Delhi) and Mr. Rahul Raj (Director , Inverted Energy).

Prof. Vijayamohanan K Pillai spoke in detail about the need of sustainable energy in the future by suitable energy storage, smart metering and introduction of smart grids. He spoke in length about ideal characteristics of intelligent Battery materials and what are different materials required for smart batteries. He described the different types of cells which are used in batteries such as cylindrical cell, button cell, prismatic cell etc. He described the analysis of structural components of Lithium-ion battery. He gave an idea of advantages of Conversion electrodes with respect to Conventional electrodes used in battery cells. Prof Pillai also spoke about the key areas on which Electrical vehicles must invest in order to increase base of consumer market. He also spoke about different MNCs working on fuel cell technologies apart from technology of battery for electrical vehicles. In the end, he spoke about advanced battery materials and batteries which hold good scope in the future. He concluded by saying that in India, public-private partnership is a must for people to adopt electrical vehicles technology in order to build a better and sustainable future.

Radiation, nuclear energy and environment: All good for human development index of a nation by Dr. D.K. Aswal

https://research.upes.ac.in/2023/02/20/radiation-nuclear-energy-and-environment-all-good-for-human-development-index-of-a-nation-by-dr-d-k-aswal/



Workshop on “Low-Cost Modular Raman & Fluorescence Based Spectroscopy”

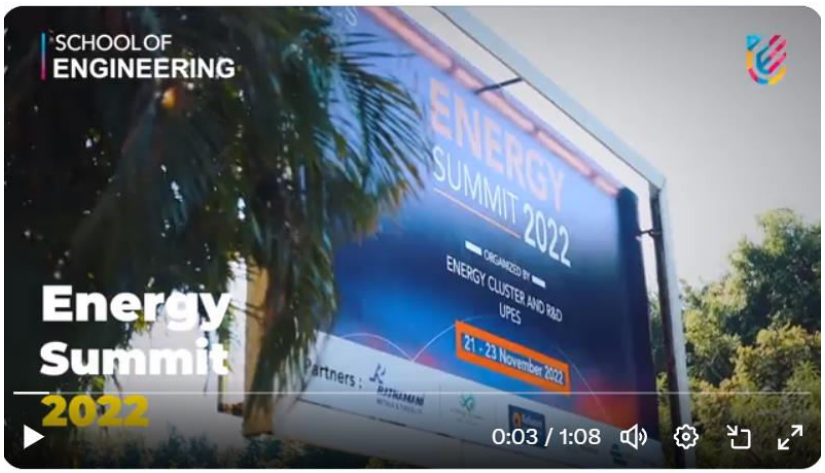
https://research.upes.ac.in/2022/05/10/workshop-on-low-cost-modular-raman-fluorescence-based-spectroscopy/

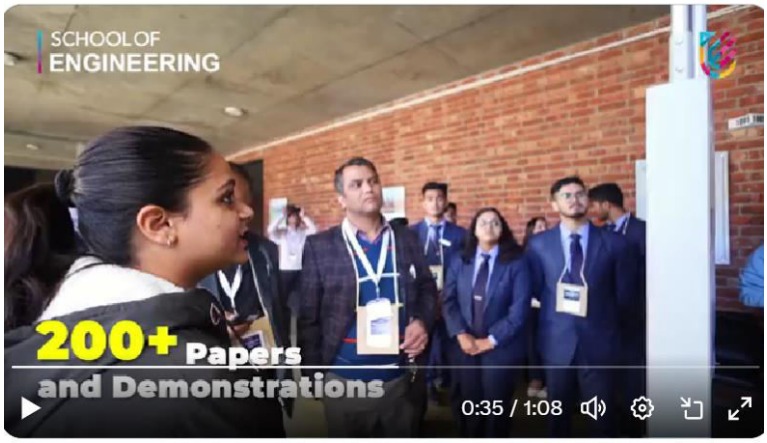
A workshop on “Low-Cost Modular Raman and Fluorescence Based Spectroscopy” was organized by Central Instrumentation Centre (CIC), UPES on Oct 07, 2021 in the Vivekananda Auditorium. Dr Ankush Vij introduced the dignitaries and welcomed all the participants. Prof Sunil K Rai (Hon’ble Vice Chancellor) and Prof Gurvinder Virk (Dean SoE) graced this occasion with their presence and also addressed the participants. Dr S M Tauseef (Associate Dean R&D) presented an overview of the research facilities available at CIC. Dr Rajendra Joshi (CEO, RI group) along with his engineers Mr Kuldeep Patel and Mr CK Patel conducted the work shop on their indigenously designed RIMS set up which they brought to UPES for practical demonstration and hands-on experience to the participants. They explained the Raman spectroscopy in very simple way along with its experimental set up. They also demonstrated absorbance, reflectance and fluorescence using same RIMS instrument. All participants attended the workshop very attentively and interacted with the industry team for their queries. The workshop was held in hybrid mode, around 70 participants including faculty members, research scholars and students were present in the auditorium and around 35 participants joined online through zoom link. RIMS set-up was also kept operational for testing research samples for Raman spectra. Many participants performed Raman experiment and around 50 samples were tested till 6:30 pm. The workshop concluded with a formal vote of thanks from Dr Prashant Rawat. The workshop was coordinated by Dr Ankush Vij, Dr Ranjeet Brajpuriya, Dr Ashish Sharma and Dr S M Tauseef.

Energy Summit 2022

https://twitter.com/UPESDehradun/status/1607585981523283969

At our Energy Summit 2022, School of Engineering students interacted with global academicians & industrialists. With 1200+ participants & 200+ project demonstrations, students got an opportunity to show their zeal towards leading the nation in its quest for an energy transition.





Secure a sustainable future with B.Tech. in Clean Energy Technologies

https://blog.upes.ac.in/the-importance-of-clean-energy-technologies/

ADITYA MUKHERJEE · SEPTEMBER 15, 2022

Image credit: Pexels

Image credit: Pexels

On completion of a B.Tech. in Clean Energy Technologies, graduates acquire proficiency in subjects like solar thermal engineering, advanced material physics, solar power technology, and more

Clean energy can be defined as the energy produced from natural resources that are sustainable and can be replenished over a period of time. This type of energy is also referred to as renewable or green energy. Essentially, the production of any clean energy does not result in the creation of environmental debt.

India is looking forward to having 175 GW of renewable energy capacity, including 100 GW of solar and 60 GW of wind energy by 2022. Make no mistake, renewable energy is going to power the future.

Just to reiterate, since coal is considered the most important fossil fuel in India, it accounts for 55% of the country's energy needs. Hence, the urgency to fall back on various sources of renewable energy for further sustainability.

The good news is that in the area of clean energy, wind power, solar power and biomass are meeting the needs of various sectors with great results. In the coming days, they would become indispensable.

Clean energy technology ensures clean energy substitution. In this regard, China has come up with a host of innovations and applications in clean power generation and operation technologies, giving a boost to large-scale exploration and integration of clean energy.

Clean technology reduces negative environmental impact through significant energy efficiency improvements, the sustainable use of resources, or environmental protection activities.

Why study clean energy technology

After completing the course, graduates can find themselves in the thick of things by playing a major role in sustainable development by promoting renewable energy technologies and providing alternative energy options to the industries.

On completion of the programme, graduates gain proficiency in subjects like solar thermal engineering, advanced material physics, solar power technology, and more.

With increasing focus on a greener world, reducing carbon footprint has become extremely important. This is where new and innovative technologies will change the way we live.

Professionals in this field can make a difference as they provide alternative energy options that can be judiciously used as reliable and efficient energy sources.

With more vacancies in the private sector, the demand for professionals in this field has gone up considerably as new job opportunities are being created in the bio-energy, wind power and hydropower industries.

Clean technologies include recycling, renewable energy, information technology, green transportation, electric motors, green chemistry and lighting.

Forms of clean energy include water power, solar power, biomass energy, geothermal energy, biogas, wave and tidal energy.

With world population galloping, there is an ever-increasing demand for energy and renewable sources are the perfect answer to providing sustainable energy solutions, while also protecting the planet from climate change.

Since renewable energy sources don't release greenhouse gases such as carbon dioxide, they do not contribute to global warming. These renewable sources can to a great extent keep a control over climate change.

On the other hand, measures such as reforestation can help to alleviate the damage being done to the climate, combining to reduce global warming.

Clean energy technology is going to play an important role in improving our quality of life by reducing air and water pollution.

According to a report published by the International Renewable Energy Agency (IRENA) in collaboration with the United Nations' International Labour Organisation (ILO), employment in the clean energy sector reached 12.7 million last year, with the creation of 700,000 new jobs in just 12 months globally. Career options in this sector include Solar Energy Specialist, Renewable Energy Analyst, Technical Consultant, Project Engineer, to name a few.

How India is implementing the Paris Agreement

https://blog.upes.ac.in/how-india-is-implementing-the-paris-agreement/

DR. RAKESH KUMAR CHOPRA · JUNE 30, 2020

India has taken concrete steps to reduce the impact of greenhouse gases on the environment and provide better living conditions to people. Although a lot still needs to be done, it can be said that the country is implementing the Paris Agreement in its true spirit

India's efforts on environment protection started with the enactment of the Environment Protection Law in 1986, which was last modified in 2018 to minimize the adverse impact of human activities on the environment. Although a lot still needs to be done, it can be said that India is implementing the Paris Agreement in its true spirit. The country has taken concrete steps to reduce the impact of greenhouse gases and provide better living conditions to its people.

Let us examine the reforms carried out in the energy sector by India, which have a direct impact on the environment and the steps required to move forward.

Reforms in the energy sector

The Government of India spelt out its policy objectives in 2015 that sustainable energy should be available to all its citizens within affordable price. The reforms in the energy sector have been carried out in a phased manner by upgrading the existing non-renewable sources, generating renewable sources of energy through 'Make in India' to become self-reliant and permitting the best technologies to operate in the country.

Renewable Energy

To begin with, renewable energy will act as a support to the existing energy sources. However, in times to come, it will take the lead. This approach will be able to provide a systematic transformation in energy generation, enabling energy security through a unified grid.

India has been able to provide round-the-clock electricity within affordable price to around 750 million people in the last ten years. The country has also been able to reduce the conventional use of biomass by providing Liquefied Petroleum Gas (LPG) with clean cooking, thus improving the living standards of people.

Light-Emitting Diodes (LEDs) have successfully used solar energy to fulfil the demand for energy-efficient lighting with low consumption cost. Its mass production has also led to the creation of local jobs.

Notably, until 2018, India's investment in solar power was greater than that of all fossil fuel sources of electricity combined. This was possible through large-scale auctions, which contributed to the development of renewable energy at rapidly decreasing prices. The government is attracting global companies to produce solar photovoltaic (PV), lithium batteries, solar charging, cooling, electric mobility, smart grids and advanced biofuels.

Non-Renewable Energy

The non-renewable sources of energy in the form of fossil fuels such as coal, petroleum and natural gas are used in power plants, refineries and Liquefied Natural Gas (LNG) terminals, which have long plant life. Therefore, they cannot be completely abandoned but used in a manner such that the carbon emissions are well within the permissible levels and the output produced is environmentally complied.

Coal

Coal sector was opened around a decade back for bidding purposes but was cancelled due to defects in the selection criteria, which created a stalemate for around six years. However, on June 18th, 2020, 41 coal blocks were opened for commercial bidding.

Amid the coronavirus crisis, the power sector is facing a challenge because of lower utilization of fossil fuels and related financing issues. To meet this challenge, a comprehensive plan has been formulated by the Indian government. It is expected that the creation of a wholesale power market will be competitive and enhance the power generation capacity. To remove the imbalances and ensure national energy security, it is essential to create a single national power gird with emphasis on encouraging investments in the power sector – both greenfield and brownfield – by debottlenecking the existing plants to produce emission-free output. Private companies operating globally, which were engaged in thermal energy for installing the power plants are now actively participating in solar and hydel energy also.

To achieve an uninterrupted growth in the power sector, the existing system needs to tackle the issues of integration and flexibility by providing inter-connectivity between non-renewable and renewable energy-based power plants. The new coal-based power plants are efficient, flexible and relatively low in emissions, thereby complying with the stringent pollution norms. Such plants are in a better position due to their economic viability compared to the older ones, requiring modifications but expensive to comply with environmental standards. Therefore, there is a need to identify those plants, which can be made environment-complied and can improve system performance.

India’s current strategic petroleum reserve capacity is 40 million barrels, which covers just over 10 days of current net imports

Natural Gas

India is the fourth-largest oil refiner, a net exporter of refined products and the third-largest consumer of oil. Therefore, our dependency on oil consumption is quite high and is likely to cross China by the end of 2020. This provides an opportunity to create an attractive market investment in the refinery sector. Accordingly, the government made a long-term roadmap to expand its refining capacity by considering the current projected demand until 2040. India is unable to fulfil its local demand due to limited oil reserves and dependence on the import of crude oil (which was 80% as of 2018). To fill the gap, the government has prioritised reducing oil imports, increasing domestic upstream activities, diversifying its sources of supply and increasing investments in overseas oil fields in the Middle-East and Africa on a long-term basis to get crude at a consistent price.

India’s current strategic petroleum reserve capacity is 40 million barrels, which covers just over 10 days of current net imports. However, with the expected growth in oil consumption, this reserve will last only for four days of net imports by 2040. Therefore, it is high time to pursue the strategic stockholding policy in the next phase to have an additional 50 million barrels as reserve capacity and accordingly the government is attracting potential investors to enhance stockholding.

The current share of natural gas in the country’s energy mix is 6%, which the government aims to increase to 15% by 2030. This will provide an opportunity to improve environmental sustainability and flexibility in its energy system.

India’s domestic gas production has been below forecast levels over the past few years. Gas has been used more extensively in residential and transport sectors but it has fallen in power generation, where imported natural gas remains a second option due to the low cost of renewables and coal. Therefore, there is a good scope of opening the natural gas market by strengthening regulatory supervision of upstream, midstream and downstream activities as part of the market reform. This will bring greater efficiency, drive up demand for gas and increase investment in gas generation, transportation and distribution.

India is committed to Goal 7 of the United Nations Sustainable Development (UNSD) Goals of delivering energy access and has been able to decrease emissions by more than 20% of the Gross Domestic Product (GDP) in the past decade. However, carbon dioxide (CO_2) emissions are still rising. India’s per capita emissions currently are 1.6 tons of CO_2, which is still well below the global average of 4.4 tons, while its share of global total CO_2 emissions is around 6.4%.

With the above position as on date, India has taken significant steps to improve energy efficiency and has been able to reduce the additional annual energy demand by 15 % (i.e. 300 million tons of CO_2 emissions reduction during 2000 to 2018). Looking at the steps taken to reduce the emissions intensity and increase the share of non-fossil fuels in its power generation capacity, one can safely mention that India complies with the Nationally Determined Contribution as per the Paris Agreement.

The expected energy demand as per the current projection is likely to double by 2040, with electricity demand increasing three times due to increased use of electric appliances combined with India’s cooling needs, which may require one billion air conditioning units by 2050. If India can raise the level of its energy efficiency by 2040 by using energy-efficient tools, it will save around USD 190 billion per year in energy imports and avoid electricity generation of 875 terawatt-hours per year, almost half of India’s current annual power generation.

The way forward and recommendations

To achieve the global environmental temperature reduction of two degrees by 2050 as per the Paris Agreement of 2015, it is time to explore the warehouse of renewable energy and utilise it efficiently by opening the market for private players. However, care must be taken to provide a level playing field by creating a regulatory framework to comply fair and transparent process to avoid litigation.

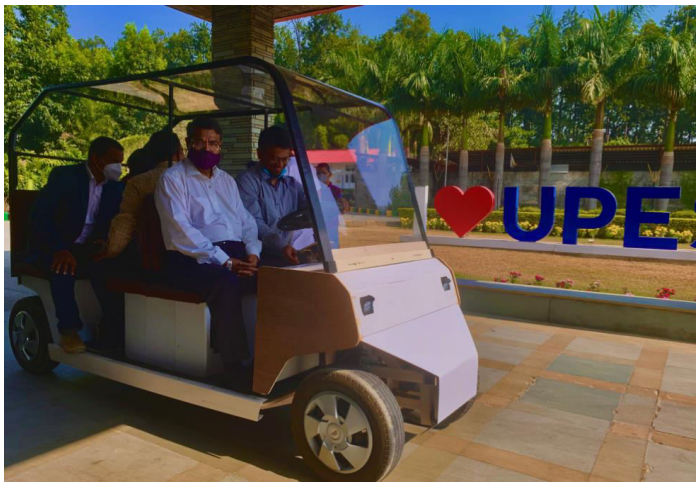
Currently, India is focusing on innovative technologies as it has increased its spending two times over a period of five years under its 'Mission innovation' with the participation of government, public and private sector. India deployed 84 GW of grid-connected renewable electricity capacity, with total generating capacity of 366 GW in 2019 and intends to achieve 175 GW of renewables by 2022, which is possible by having a focus on the flexibility required for effective system integration.

A long-term national energy policy, private investors' participation, enhanced dedicated emergency stock and learning from the best practices will help in achieving the targets set out in the Paris Agreement.

Team UPES creates economical and energy-efficient e-vehicle

https://blog.upes.ac.in/team-upes-creates-one-of-its-kind-e-vehicle/

PRADEEP JAGWAN · NOVEMBER 11, 2020



The electric vehicle, U-BAHN, has been developed in nine days on the campus with a cost of Rs.2 lakh. It can travel at a speed of 25 kms per hour and will be embedded with an IoT-based system to help the driver know about the pickup and drop location

Automotive analysts had predicted that 2020 is going to be the year of electric vehicles. This came in the backdrop of a renewed awareness to cut down carbon dioxide emissions across the world. UPES students, too, contributed towards this global effort to protect the future of the planet.

The university's Mechanical Engineering students Manas Jaiswal, Abhinav Dhaka, Annirudha Das, Dharnidar, Archit Saroha, Chetan Saini, Nishant Verma, Nitish Raj, Prashant Kumar, Priya Singh, Pankaj Kumar, Mayank Dahiya, Prabudh Sanket, Prakhar Khandelwal and Aditya Katariya recently designed and manufactured an E-vehicle to be used on the college premises.

The complete prototype of the electric vehicle called U-BAHN was made in the college workshop under the guidance and support of faculty and lab in-charge. The e-vehicle will be embedded with an Internet of Things (IoT)-based system, which will help the driver to know about the pickup and drop location. The user can call for a service using an application. The power train of the e-vehicle has an 85AH battery, which is capable to propel the vehicle from a standstill position and take the vehicle to a speed of 25 kilometres per hour. It is also assisted by a brushless DC motor which is of 48 V. The exterior bodywork will be designed using High Impact Polystyrene Sheet (HIPS) and the roof of the vehicle will use polycarbonate material.

This vehicle is capable to mobilize a quartet within the campus. MacPherson Strut type suspension is used in front of the vehicle whereas in the rear leaf springs are used to support the passenger's weight. Also, a trunk is provided at the back of the vehicle to carry the passenger's luggage. The vehicle looks elegant and has a compact steering assembly that provides smooth movements of the tyres while taking turns.

The e-vehicle will be embedded with an Internet of Things (IoT)-based system, which will help the driver to know about the pickup and drop location

Generally, golf carts cost around Rs.7 lakh, but E-BAHN was made with a compartively meagre fund of Rs.2 lakh without compromising on the quality, making it economical, simple, reliable, and competent.

Swapnil Sureshchandra Bhurat, from the School of Engineering, says “Coming up with U-BAHN within a short period was a team effort. Mechanical Engineering department came up with the idea of developing an e-cart with minimum cost and power rating motor. The vehicle was developed on the campus within nine days. Golf carts generally have six kilowatts power rating motor, whereas the one in U-BAHN has 1.2 kilowatts. There is a gear reduction system incorporated in the vehicle to provide a torque. In the future, we will install a solar panel roof, which will help charge the battery, which will further increase the run time without battery loss. I thank the Dean, School of Engineering, Dr. Kamal Bansal, and Head of Department, Mechanical Engineering, Dr. Ajay Kumar for their kind support. Everyone involved in the project burnt the midnight oil and gave a proper shape and added to the aesthetics of the cart.”

Mr. Siddharth, faculty, School of Design says, “The main concept behind this design was to make it simple, airy, open and easy to step-in and step-out. In terms of modularity, we added LED lights in front and at the back with a transparent sunroof. Soon, we are also thinking about making the design more feasible to be used by the locals. In the process, we worked with different materials such as HIPS, plywood, and roof polycarbonate sheet. We came across some challenges such as pipe bending and stitching leather, which eventually became a learning lesson. In the end, I would like to thank Dean, School of Design, Ms. Manisha Mohan who was open to this idea from the very beginning.”

Another faculty, Mr. Ram Kunwer (Assistant Professor-SG), Mechanical Engineering Department from the School of Engineering, took the responsibility of vehicle fabrication. Technicians Ranjit and Sushil worked day and night on the product.

“This futuristic and technologically advanced e-vehicle will be both environment and user friendly. With a high market potential, there are all possibilities of scalability,” says, Dr. Githa Hegde, Dean, School of Business.

Kishore, faculty, School of Design, says, “I was fortunate to have worked on the styling part of the Campus Utility Vehicle (CUV). Working on the design, especially bending circular steel pipes and HIPS sheets to desired angles and radii was exciting. Working on this project helped me enhance my knowledge in materials and prototyping, the two important areas of Transportation Design.”

Solar Tree powered electric bicycle – A step towards sustainable transport

https://blog.upes.ac.in/solar-tree-powered-electric-bicycle-a-step-towards-sustainable-transport/

PRADEEP JAGWAN · SEPTEMBER 30, 2020

Researchers at UPES take a step ahead in their commitment to a sustainable and environment-friendly future

Researchers Dr. Roushan Kumar, Divyanshu (M. Tech- Automation and Robotics), Basant Singh Bhaskar (B.Tech -Mechatronics Engineering), Udayveer Mittal (B.Tech – Mechatronics Engineering), through their relentless effort and constant urge to make a better future, developed a self-powering Solar Tree set up at UPES campus. In addition to the solar tree, they also developed a model bicycle with an electric motor that is an eco-friendly step towards short-distance transportation. The integrated electric motor can be used for propulsion of the bicycle to a speed of 30-35 kilometers per hour without pedaling for up to a run of 70-80 kilometers.

Researchers through their relentless effort and constant urge to make a better future, developed a self-powering Solar Tree set up at UPES campus

Explaining the running principle of the solar tree, Dr. Roushan says, “Sunlight is regularly considered as the main bounteous and free energy asset. Among all the various methods accessible to harness solar energy, the most well-known and developed innovative technique is the solar photovoltaic cell. A solar tree has various design parameters in the Himalayan region. The development work is executed in such a way so as to cater to multiple user demands and provide an environmentally-viable solution.”

The solar tree is the most constructive and environment-friendly solution in the hilly region because of poor flat land availability, explains Divyanshu. “A new idea of a modular solar tree design,” he further adds, “is presented in our research which consists of a monocrystalline cell with front tempered glass, anodized aluminum alloy frame and hybrid solar inverter based on DSP technology.”

The bicycle is capable of taking and supporting a seating load of about 120 kilograms

Udayveer and Basant elucidate why the idea of a solar tree is a revolutionary lighting concept for the Himalayan region. According to them, “Less space utilization, no overlapping of solar plates and maintenance-free equipment with the latest technology is the source of inspiration for the development of a solar tree. Our current research paper deals with modular frame design and tilted absorber PV plates lead to more exposure to sunlight. The designed tree is a non-tracking solar tree, which is furnished with 3 watts and 6 watts LED light, multiple USB 2.0 port and basic electrical socket to charge laptops as well as mobile phones.” The research team is ecstatic that its rationale for modeling an electric bicycle has been well-received. “Our driving force,” they explain, “was that the bicycle is the finest mode of transport known to man which emits no greenhouse gas emissions.” The features of the bicycle, apart from the electric motor that enables its propulsion, include a speed selection mode, inbuilt charging socket, clock, speedometer, storage box, foot-rest, led lamps and automatic light sensors. Additionally, a user can book a ride using a simple mobile application. The bicycle is capable of taking and supporting a seating load of about 120 kilograms at a time and can be propelled to a speed of 30-35 kilometers per hour without pedaling for up to a run of 70-80 kilometers.

A future perspective on the sustainable and renewable energy sector

https://blog.upes.ac.in/a-future-perspective-on-the-sustainable-and-renewable-energy-sector/

MANSHA DHINGRA · FEBRUARY 9, 2021

In today's age of energy crisis, a career in sustainable and renewable engineering is a lucrative choice. Energy engineering graduates can explore opportunities to work as solar energy system engineers, project managers, wind farm designers, and more

Engineering is a vast field of study that is going to remain until we cease to exist. Industrial revolution 4.0 has introduced several new technologies (Internet of Things, Machine Learning, and Robotics) that engineers need to imbibe to meet future demands.

Given the new industrial revolution, it is important that we re-look the existing engineering specialisations by introducing some new-age courses that will be relevant in the future years. B.Tech. Advanced Materials and Nano Technology, B.Tech. Medical Devices, and B.Tech. Renewable and Sustainable Energy Engineering are some of the advanced engineering programs.

India is the second-largest populous country and the fastest-growing economy in the world. This has led to increasing demand for energy in India. Due to its dense population, the pollution level in India has also risen. The Indian government is planning to boost the production of renewable energy. Solar energy, wind energy, thermal energy, biomass energy, and tidal energy are important renewable energy resources in India. At present, all the major industries need to monitor energy use. This implies that opportunities for renewable and sustainable energy engineering graduates across all sectors (such as the food industry, pharmaceutical, biopharmaceutical, medical device, and transport sector) will rise sharply.

The country's geographical location has the potential to generate solar energy. The government of India and intergovernmental agencies are looking forward to source and supply energy resources to meet the demands of citizens and industry.

A promising future for specialists in B.Tech. in Renewable and Sustainable Energy

Earlier, renewable energy technologies had an environmental niche. But today, the sustainability of renewable energy demonstrates a key economic driver in generating revenue, creating jobs, and stimulating technological developments. Planning, financing, installation, storage, distribution, operation, maintenance, processing, and renewable electricity sales and grid management, opens the door for countless job opportunities.

With the world's core resources depleting and causing damage to environment and ecosystem, the industry is rapidly moving towards sustainable technology. For instance, energy-saving appliances, electric vehicles, access to solar energy and finding alternatives for plastic usage etc.

According to Dr. Sushabhan Chowdhury, Department of Electrical and Electronics, UPES, "The demand for engineers working in the renewable sector will no doubt increase in the coming years. Engineers are needed to research, design, and construct ways to find new, eco-friendly, and

sustainable sources of energy. The renewable and sustainability sector is a great choice for students. UPES is one of the few institutions offering a specialisation in B.Tech. Renewable and Sustainable Energy."

- Graduates in renewable and sustainable energy can work in the following areas:
- Process engineering
- Design engineering
- Research and development
- Program engineers
- Energy auditors
- Civil and construction
- Environmental engineers
- Transportation engineering
- Defence
- Energy systems design, conventional and renewable
- Energy management and project management
- Manufacturing industry, particularly big energy users, such as food, pharmaceuticals, and transport industries
- Consultancy

Why UPES School of Engineering?

UPES School of Engineering, Dehradun, is at the forefront of delivering education that ensures students are job-ready as soon as they graduate. Sector-centric knowledge, along with practical and theoretical knowledge enables students to make a mark. Additionally, students can pursue minor specialisations in latest technologies such as Artificial Intelligence and Machine Learning, Robotics and Self-Driven Vehicles, Internet of Things, Data Analytics and Blockchain. Academic-industry alliances with giants such as the London School of Business, Singapore, Larsen and Turbo, and Microsoft give an edge to UPES students.

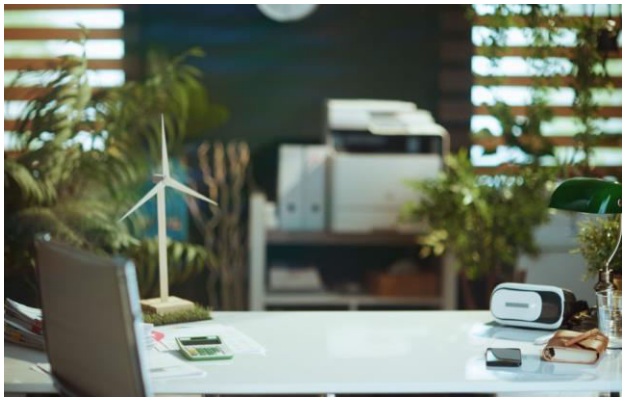
At UPES, students are offered world-class academic infrastructure, multimedia-enabled classrooms, modern research labs, large expanse of sports fields all around the campus, food courts, hostels, and other facilities for curricular and extracurricular activities. A premier institution of learning with an emphasis on holistic development, the university develops and hones future leaders for diverse high-growth sectors, both in India and overseas.

(The writer is an avid blogger who has worked with media organisations such as NDTV and India Today in the past. In her current role, she primarily writes on trends in the education industry and skills needed for workplaces of the future.)

5 innovative strategies for effective HR management in the energy sector

https://blog.upes.ac.in/5-innovative-strategies-for-effective-hr-management-in-the-energy-sector/

DR. ANURAG SINGH · AUGUST 1, 2023



The renewable energy sector is expanding at an exponential rate. According to a report published by International Energy Agency (IEA), renewable energy is forecast to grow by 1200GW in the next five years; that equals the total electricity capacity of the United States. The development of alternative power sources in new geographic locations has created a lot of exciting opportunities and job openings.

HR plays a pivotal role now as it has the important task of supporting this growth, particularly in recruiting and developing a skilled workforce. The focus currently is to recruit the best talent to fill positions in this rapidly expanding industry for sustaining the growing demand.

Implementing People Management Skills

HR analytics has indeed come a long way. From simply static reports, HR managers have started deploying various analytics models apart from following traditional methods. The current focus should be on prescriptive analytics which combines the historical capabilities of static and descriptive models, with a forward-looking perspective. It enables users to gain insights on not just what will happen next, but also on what should be done next to tackle the issue on time. It also helps managers and HR to implement better people management skills to curb attrition and ensure better employee satisfaction.

Embracing Remote Work

The workplace is becoming increasingly global. The idea of work has changed and companies need to accept this progress, especially teleworking if companies don't want to lose out on talent. HR needs to work on bringing in and accepting this cultural change to help employees work better and contribute to the growth of the company. Having an online mode of onboarding helps candidates to consider opportunities that they wouldn't have otherwise thought of.

Diversity and Inclusion

An organization must nurture an inclusive environment at work. It is important to understand that when employees love collaboration and fairness, it has a direct impact on their productivity and thus their well-being. This type of workforce is more innovative, compelled to shift jobs, and ultimately improves the bottom line of the business.

The air of an inclusive workplace allows everyone to feel that they are respected, safe, heard, and accepted, irrespective of their gender, background, preference, physical ability, etc.

Employees perceive leadership as inclusive when managers listen empathetically to and advocate for their team. Inclusive managers see their team members as valuable individuals. The scope of favouritism should be too less, and everybody should be s treated with fairness by embracing non-discriminatory practices. A simple step like keeping inclusion at the forefront of the onboarding process provides an impression that the employees will receive the support they need while settling into their roles.

Employee Development

Employee development demands a continuous effort to strengthen work performance by incorporating different approaches like coaching, training sessions, and leadership mentoring. These sessions can help employees learn the skills they need in their current roles and introduce leadership skills and software knowledge they might need in the future.

Furthermore, safety precautions related to the COVID-19 pandemic moved about 80% of employees to remote work, according to research firm Brandon Hall Group. Since most of the employees previously worked on-site, companies and those working for them have grappled with finding and implementing new tools and resources to accommodate this new environment for work. Training and development focused on these new processes can aid in making this transition.

Self-transformation

Technology is changing and AI has taken over the world with a storm. Companies need to focus on training and development in the latest technologies to help employees be well versed with new introductions to be able to perform better at their jobs.

Focus on AI Chatbots

When organizations plan or combine GO group orientation programs, HR can include AI chatbots to develop a knowledge management system where collective information from the outside world is presented to the employees as well as provide new insights for better information sharing.

Training and development programs also can help employees discover areas in which they could use additional educational opportunities and support. Employee training programs focussing on soft skills s such as resilience, emotional intelligence, and agility in professional settings can create an atmosphere that fosters productivity and camaraderie.

Also, advances in human resources technology are helping HR teams become even more engaged in their company's overall strategic objectives. Even job onboarding can become more effective with the AI Chatbots.

Focus on a Green Mindset

HRM across different sectors has started to utilize whatever is available in hand to reduce the wastage costs incurred by organizations. The focus is now on energy-efficient workspaces, online training, teleconferencing, responsibilities-sharing, car-sharing, electronic filing, etc., along with other environmentally friendly human resource measures to contribute to greater efficiency, better employee retention, lower costs, and better employee engagement. These initiatives assist companies in identifying cost-effective alternatives without sacrificing top talent.

HR managers have a greater role in hand. They have to self-update themselves with the latest changes to ensure they can help companies and their employees in a more constructive way.

(The writer is Assistant Professor, UPES School of Business)

Clean Energy

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"Our universe is a sea of energy - free, clean energy. It is all out there waiting for us to set sail upon it."

Clean energy is energy that comes from renewable, zero emission sources that do not pollute the atmosphere when used, as well as energy saved by energy efficiency measures.

Clean energy appears to be the future for the power needs of humanity across the globe as reliance of fossil fuels continues to diminish. As the drive towards clean, green and renewable energy continues to advance, the cost will fall and work will be created to develop and install these new power solutions.

More and more people are recognizing the environmental, societal and economic benefits of clean energy and, as more cities, states and nations sign up to a green power agenda, this will continue to advance.

A transition to clean energy is about making an investment in our future.

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#RENEWABLE_ENERGY is the future of the country not only for the country but it is also the future of the world. With the rate of development and urbanization going around the globe, we have to switch to renewable resources. We should think of alternative ways and technology should be made for the optimum use of natural resources.

Look around yourself and find ways to switch to renewable resources.


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