SDG AT AIUB

American International University-Bangladesh (AIUB) is committed to achieve the United Nations 17 Sustainable Development Goals through different initiatives. These reports outline year-long different activities, such as research & publications, enhancing social inclusion, encouraging environmental sustainability, partnerships, good governance, and diversity among students and employees as well as its associated mapping to different SDGs.

American International University-Bangladesh (AIUB)

SDG Activity Report - 2022

SDG 13: Climate Action

AIUB SDG Activity Report 2022

SDG 13: Climate Action

In the pursuit of addressing the urgent global challenge posed by climate change, American International University-Bangladesh (AIUB) has emerged as a proactive force, aligning its efforts with the principles of Sustainable Development Goal 13: Climate Action. Through a combination of university activities and faculty research initiatives, AIUB is actively contributing to the global call for climate resilience and sustainability.

The university's commitment to a sustainable future is palpable through activities like the "Webinar on Solar PV Energy Towards Carbon Neutrality By 2050." This platform serves as a knowledge hub, fostering discussions and awareness on the pivotal role of solar energy in achieving carbon neutrality. By engaging students and stakeholders in conversations about sustainable energy solutions, AIUB is sowing the seeds for a future powered by renewable resources.

AIUB's dedication to environmental causes is further showcased in the celebration of "World Environment Day 2022." This event is a testament to the university's holistic approach to climate action, emphasizing the importance of collective responsibility and awareness in safeguarding the environment. The celebration serves as an inspiration for the AIUB community to actively participate in initiatives that contribute to a healthier planet.

The Faculty Research and Publication endeavors at AIUB underscore the institution's commitment to advancing the frontiers of climate science. Research projects such as "Microbial Abundance of Waste-Derived Biochar Incubated Acid Soils in Bangladesh" and "Spatial Distribution and Ecological Risk Assessment of Potentially Toxic Metals in the Sundarban Mangrove Soils of Bangladesh" delve into critical environmental issues, providing valuable insights for sustainable solutions.

Cutting-edge research like "Highly Sensitive and Fast Responsive Humidity Sensor based on 2D PtSe2 with Gamma Radiation Tolerance" showcases AIUB's commitment to developing innovative technologies that can contribute to climate monitoring and mitigation. The university's research initiatives extend beyond national borders, as seen in the paper on the "Necessity of Inserting Climate Change Clause in the Transboundary Water Agreements of South Asia," emphasizing the interconnectedness of climate issues and the importance of international cooperation.

Furthermore, AIUB's research on "Modeling and Analysis of Cost-Effective Energy Management for Integrated Microgrids" and "Optimized Performance and Economic Assessment for Hybrid Island Microgrid System Considering Uncertainties" reflects the institution's focus on sustainable energy solutions. By addressing the complexities of energy management and microgrid systems, AIUB is paving the way for practical and scalable solutions in the fight against climate change.

In conclusion, AIUB stands as a beacon of positive action in response to the climate crisis. Through a combination of educational initiatives, celebratory events, and cutting-edge research, AIUB is fostering a culture of environmental stewardship and climate consciousness. The university's commitment to Sustainable Development Goal 13 is not only commendable but also indicative of a bright and sustainable future that AIUB envisions for the global community.

Contents

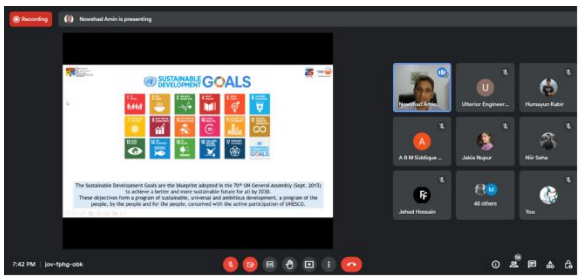
University Activities

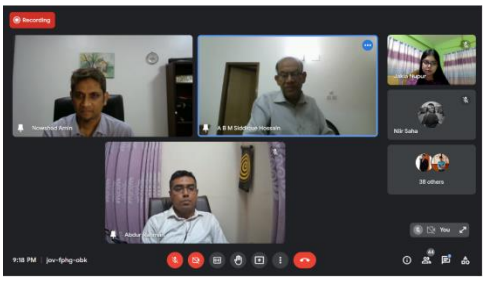
Webinar On “Solar PV Energy Towards Carbon Neutrality By 2050”

On Monday, November 7, 2022, the Engineering Students Association of Bangladesh (ESAB) AIUB Unit Face successfully organized a webinar on “Solar PV Energy Towards Carbon Neutrality By 2050” by using online platform google meet. The session began at 7:00 PM with more than 70 attendees. The program started with the opening remarks by Prof. Dr. A.B.M. Siddique Hossain (Dean, Faculty of Engineering, AIUB). In his speech, he emphasized the significance of carbon neutrality and the impact of solar PV on building a sustainable and environmentally friendly world.

After that, the floor was given to the distinguished speaker, Dr. Nowshad Amin (Professor, Institute of Sustainable Energy, Universiti Tenega Nasional |@UNITEN, The Energy University| & Chief Advisor Ulterior Engineering Intl). In his speech, he began by explaining the fundamentals of the solar cell and the potential of renewable energy to reduce the amount of carbon in the environment. In the middle, he discussed the various kinds of solar cells and their respective efficiencies. In addition, he addressed the evaluation of solar panel size, grid-connected solar PV residential systems, and several other problems. Aside from that, he spoke about the benefits of solar-powered technologies and their importance in the world's long-term development for people. Lastly, he talked about the steps we as humans need to take right now and the responsibilities that governments and other climate-related world organizations need to take to make the world a better place to live and ensure carbon neutrality by 2050.

After that, the Advisor of ESAB AIUB Unit Face, Prof. Dr. Md. Abdur Rahman (Associate Dean, Faculty of Engineering, AIUB), gave the closing remarks and shared his valuable experience and knowledge on solar PV and its importance to carbon neutrality by 2050 with the participants. Afterwards, a virtual token of appreciation was presented to the distinguished speaker.





World Environment Day 2022 celebrated

The AIUB Social Welfare Club - Shomoy of the American International University-Bangladesh (AIUB), in collaboration with the Department of Chemistry, organized a series of events to celebrate the World Environment Day 2022. On the 5th of June 2022, the event was inaugurated by Ms. Nadia Anwar, the Founder Member of the AIUB Board of Trustees, where Dr. Abdur Rahman, there Associate Dean of the Faculty of Engineering, Dr. S. Mosaddeq Ahmed, the Head, for the Department of Chemistry, Dr. Mohammad Mahbub Rabbani, the Deputy Director of the Dr. Anwarul Abedin Institute of Innovation, Mr. Manzur H. Khan, the Director of Student Affairs, Mr. Ziarat H. Khan, Deputy Director for Student Services & Welfare, and several other faculty members, administrative officials, and students were also present. Ms. Anwar planted a tree on the campus premises, commemorating the occasion, after which the Dr. Rahman, Dr. Ahmed, and Dr. Rabbani, together presented saplings to the members of the AIUB Shomoy Club as a token to initiate their tree plantation campaign and encourage other students to join the cause.

A rally comprising of members of the AIUB Shomoy Club, general students, faculty members, and administrative officials marched across the campus, with various placards to spread awareness on climate change and inspire us to take necessary steps to save our environment. Later, a constructive seminar on the World Environment Day – Session to Save the Earth was held in the Media Studio on campus, with Mr. Saif Islam, the Program Officer at the International Labor Organization (ILO), as the guest speaker, who shared his experience and insights on climate change with the students who attended the session. Dr. Ahmed and Dr. Rabbani gave the welcome address and the vote of thanks, concluding the session by presenting a token of appreciation to the esteemed guest speaker. The series of events motivated students and staff alike to undertake actions to protect and preserve our environment and work towards making the world a better place today to ensure a brighter future tomorrow.

Faculty Research and Publication

Microbial Abundance of Waste Derived Biochar Incubated Acid Soils in Bangladesh.

Author: PROFESSOR DR. MD. FARUQUE HOSSAIN et al.

Brief Description:

Due to climate change biochar is recently recommended as a control approach to increase crop productivity and global warming reduction. As biochar application changes the soil pH towards alkalinity, this effects acid soils nutrient cycles the same as microbial abundance. This research was conducted to investigate the microbial abundance as affected by waste-derived biochar application in two different rates on acidic soil of Bangladesh. Slow pyrolyzed (500±50ºC) different waste-derived biochars viz. sewage sludge, sugarcane bagasse, potato peels, water hyacinth, and organic waste were applied at 10 tons ha-1 and 15 tons ha-1 on the acidic soil. An in-vitro incubation study was conducted on experimental soil applying all the biochar to understand how nutrient availability and carbon dynamics affect the microbial abundance of the acid soil. The incubation study was divided into two stages: submerged condition (up to 60 days) followed by a dry condition (61 to 120 days) and biochars were applied in two different rates such as 10 and 15 tons ha-1. The viable count of bacteria significantly ($P<0.05$) increased with the variation of incubation periods and soil moisture content, although the rates did not make any difference. The beneficial Rhizobium spp. bacteria count ranged from 4.21 to 6.47 log CFU/g; Azotobacter spp. count ranged from 2.33 to 5.60 log CFU/g and Phosphate Solubilizing Bacterial count ranged from 2.30 to 3.74 log CFU/g. However, no sign of coliform bacteria or Escherichia coli was found in any sample, but also none of the biochar amended soil samples possessed Pseudomonas spp. and Trichoderma spp. In outcome, the waste-derived biochars treatments showed an insignificant impact on microbial parameters over the first 2 months after biochar incorporation which progressively increased with the course of time and the presence of oxygen.

Source: https://ccsenet.org/journal/index.php/ep/article/view/0/47003

Application of semi-distributed hydrological model in northern region of Bangladesh

Author: KHADIZA AKTER MITU et al.

Brief Description:

Measuring discharge in a developing and riverine country like Bangladesh is very important to predict flood and proper land utilization for sustainable development. The Teesta River is one of the most important trans-boundary rivers of northern region of Bangladesh. Bangladesh has long argued that India's construction of the Gazoldoba Barrage upstream of Dalia has significantly reduced the availability of water in the dry season. Furthermore, the release of water during the monsoon season causes flooding and bank erosion in downstream. With this issue in mind, a

hydrological model for the Teesta basin has been developed using a semi distributed model Soil and Water Assessment Tool (SWAT). In this research, we are interested to investigate discharge estimation and to determine watershed parameters, land use, soil and slope modeled of Teesta watershed and the percentage area distribution, which are outlined from the data observed for Northern region of Bangladesh by using SWAT. For model calibration SWAT_CUP SUFI-2 algorithm has been used at Kaunia station, out let of Teesta watershed. The calibration and validation periods have been selected 2009 to 2013 and 2014 to 2017 respectively. Discharge for both daily and monthly time step are generated by the model. The performance of the calibration and validation has been assessed by different statistical techniques. During the calibration, in daily simulation the NSE value is 0.80 while R2 is 0.82, which are quite reasonable and during the validation period the values of NSE and R2 are 0.76, 0.77 respectively also quite reasonable. In monthly simulation, the NSE, R2 values for calibration period are 0.92 and 0.93 respectively while the values of validation period are 0.84 and 0.88, respectively. Overall, the model efficiency is satisfactory. The performance of the model indicates that such an approach can indeed produce an acceptable result for both daily and monthly simulation. The results are presented graphically to compare observed and simulated result.

Source: https://www.woarjournals.org/admin/vol_issue1/upload%20Image/IJGAES101202.pdf

Necessity of Inserting Climate Change Clause in the Transboundary Water Agreements of South Asia

Author: FERDOUSI BEGUM et al.

Brief Description:

The transboundary water agreements are created worldwide in negotiation among different States to avoid any conflict relating to shared water resources and South Asia is not an exception. South Asia isa region having conflict over shared water resources due to water scarcity for an over growing population. One of the major challenges associated with the management of transboundary water resources is to develop suitable mechanisms for managing shared water resources while adapting the impact of climate change as climate change has a major impact on water scarcity. The amount of water may increase or decrease due to climate change in any shared water resources of South Asia creating impact on water allocation system; the consequence of which is conflict over shared water in South Asia. Therefore, the impact of climate change should be taken into consideration for water resource planning, management and decision making in the transboundary water agreements of South Asia which is absent until now. This study unveils the legal as well as institutional arrangements to allocate shared water in transboundary water agreements of South Asia. It suggests some flexible mechanisms or climate change clause to be included in the transboundary water agreements of South Asia and the necessity behind doing so to adapt the impact of climate change.

Source: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4377602

Spatial distribution and ecological risk assessment of potentially toxic metals in the Sundarban mangrove soils of Bangladesh.

Author: PROFESSOR DR. MD. FARUQUE HOSSAIN et al.

Brief Description: At present, there are growing concerns over the increasing release of trace metals in the Sundarbans mangrove areas in Bangladesh due to nearby shipbreaking and metallurgical industries, untreated waste discharge, navigation activities, and other natural processes that deposit trace metals into soils. The current study investigated the spatial distribution, contamination level, and ecotoxicity of eight trace metals (Fe, Mn, Cu, Zn, Pb, Cd, Cr, Ni) in Sundarbans soils. Results revealed that all the trace metals except Cr were present in higher concentrations compared to Earth's shale and/or upper continental crust. Principal component analysis and Pearson correlation showed strong positive correlations ($p < 0.05$) between Fe, Mn, Cu, and Zn; Ni with Mn and Cr. There were significant associations ($p < 0.05$) of % clay and total organic carbon (TOC) with Pb-Ni-Cr and negative correlations of pH with all the trace metals. The hierarchical cluster analysis grouped Pb, Ni, and Cd into one distinct cluster, suggesting they are derived from the same sources, possibly from anthropogenic activities. Geo accumulation index (I-geo), enrichment factor (EF), contamination factor (CF), and spatial distribution showed moderately polluted soils with Ni, Pb, and Cd (EF = 3–7.4, CF = 1–2.8, I-geo = 0–0.9) and low pollution by Zn, Cu, Fe, and Mn (EF < 3, CF < 1, I-geo < 0). The ecological risk index (RI) revealed that S-4 (RI = 114.02) and S-5 (RI = 100.04) belonged to moderate risk, and other areas posed a low risk (RI < 95). The individual contribution of Cd (25.9–73.7%), Pb (9.2–29.1%), and Ni (9.6–26.4%) to RI emphasized these metals were the foremost concern in the Sundarbans mangroves due to their long persistence time and high toxicity, even if they were present in low concentrations.

Source: https://www.nature.com/articles/s41598-022-13609-z

Highly Sensitive and Fast Responsive Humidity Sensor based on 2D PtSe2 with Gamma Radiation Tolerance

Author: DR. SHUVRA MONDAL et al.

Brief Description: 2D transition-metal dichalcogenides (TMDs) with their unique properties have accelerated the study of emerging sensors and nanoelectronics to embed in various industries including severe environments such as nuclear power plant, low Earth orbit, and space. Therefore, a systematic investigation of the sensing properties and ionizing radiation effect on 2D TMDs is required. This study reveals a facile humidity sensor based on 2D platinum diselenide (PtSe2), and the effect of a high dose of gamma (γ-ray) radiation on their physical and electrical properties. The proposed humidity sensor exhibits notable variation of current signal up to 105 orders under the relative humidity (RH) range of 20–85% and a fast response time of 60 ms. The real-time electrical output of the PtSe2 during irradiation by 10 kGy of γ-rays (60Co), followed by material characterization confirms their unique stability under gamma radiation. Furthermore, precise and fast detection of moisture by the proposed PtSe2-based humidity sensor is demonstrated as a potential leak locator application.

Source: https://onlinelibrary.wiley.com/doi/abs/10.1002/admt.202100751

Assessment of environmental quality of an area adjacent to the relocated tannery industries at Hemayetpur, Bangladesh.

Author: PROFESSOR DR. MD. FARUQUE HOSSAIN et al.

Brief Description:

The deterioration of environmental quality due to wastes generated from tannery industries is an alarming global issue in Bangladesh. To assess this problem in an area adjacent to the recently shifted tannery industries at Hemayetpur, soil, water and plant samples are collected from upstream as control, secondary treatment ponds, main discharge station and downstream at 500, 1000, 2000 and 3000 m across the areas and are analyzed for environmental quality. The water samples of Dhaleswari river are slightly acidic to moderately alkaline pH from 6.55 to 10.60, high TDS from 176 to 10,433 mg/l, EC from 305 to 18,206 µS/cm, nitrate from 0.14 to 194 mg/l, sulfate from 10.72 to 8922 mg/l, moderate phosphate from 0.58 to 7.2 mg/l and low DO from 1.61 to 5.50 mg/l. It is clearly noticed that most of the water parameters exceeded WHO guideline values except pH and phosphate that indicates Dhaleswari river water quality is declining slowly. The available concentrations of nitrogen, phosphorus, potassium and sulfur in soil varies from 12 to 263, 1.19 to 38, 17 to 170, 251 to 680 mg/kg, respectively, whereas, the total concentration ranges from 0.03 to 0.14%, 0.090 to 0.14%, 0.12 to 0.48%, and 0.11 to 0.42%, respectively. In soil samples, total phosphorus and potassium concentrations are increased but sulfur decreased. The soils are found acidic in nature that have high EC 8.17 dS/m. A significant positive correlation is found with each other of nitrogen, phosphorus, potassium and sulfur concentrations in soil samples. The nutrients in plant samples have no deficiency those are within the optimum range.

Source:
https://www.researchgate.net/publication/358532792_ASSESSMENT_OF_ENVIRONMENTAL_QUALITY_OF_AN_AREA_ADJACENT_TO_THE_RELOCATED_TANNERY_INDUSTRIES_AT_HEMAYETPUR_BANGLADESH

Modeling and analysis of cost-effective energy management for integrated microgrids

Author: ABU SHUFIAN et al.

Brief Description:

A microgrid concept is an innovative approach for integrating hybrid and renewable energy sources into the utility grid. The uncertainties because of the intermittent nature of renewable energy resources, the load, and market price are significant challenges. In the traditional heuristic method, data is forecast but not known perfectly. Improving energy storage systems and energy management systems (EMS) development using optimization-based methods is a possible solution to improve the performance of microgrid operations. The EMS is an essential part of the distributed energy resources in the microgrid system, especially when power generation, transmission, distribution, utilization, and variable pricing are involved. This optimization process

developed in this paper uses forecasted costs and loading conditions to store or sell the energy from an integrated grid battery system. Two approaches are introduced in this research work: the heuristic method using state flow (chart flow) and the optimization method based on linear programming (LP), which minimizes operation costs (savings of around 19% cost) subject to operational constraints. The LP optimization saves roughly 3.44–5.01% of excess grid energy. Several plausible outcomes of this research study simplify the comprehensive, integrated microgrid simulation for EMS optimization algorithm validation. The suggested integrated microgrid management system might be a testbed for smart grid technology research.

Source: https://www.sciencedirect.com/science/article/pii/S2666790822001136?via%3Dihub

Optimized Performance and Economic Assessment for Hybrid Island Microgrid System Considering Uncertainties

Author: ABU SHUFIAN et al.

Brief Description:

Distributed energy resources (DER) based microgrid system integration over conventional grids at remote or isolated locations has many potential benefits in minimizing the effects of global warming. However, this emerging microgrid technology brings challenges such as high capital costs, stable performance, uncertainties, operation, maintenance, and management issues. This research introduces an island microgrid system with a correlation of PV/wind/biomass/electrolyzer/hydrogen storage/fuel cell/diesel generator. The suggested hybrid system is assessed based on the different natural uncertainties of the DER, considering the availability of wind speed, solar irradiation, and biomass fuels. Optimized electricity production and possible economic interpretation of the microgrid system are revealed. Day-ahead forecast generation and load demand dispatch analysis related to various uncertainties are estimated and calculated by the net load demand forecasting approach. With the help of optimal power dispatch scheduling, the day-ahead generation and load demand uncertainties are effectively handled. A few plausible case studies bespeak the suitability of the suggested island microgrid system in different environmental situations where the national grid is unavailable. The real-time simulation of the proposed model amplifies the feasibility of generation synchronization with load demand.

Source: https://link.springer.com/article/10.1007/s40866-022-00156-9

Plant Leaf Disease Detection Using Image Processing: A Comprehensive Review

Author: TANVIR AHMED et al.

Brief Description:

In this review paper, previous and current works for plant leaf disease detection have been studied. The traditional manual visual quality inspection cannot be defined systematically as this method is unpredictable and inconsistent. Moreover, it involves a remarkable amount of expertise in the field of plant disease diagnostics (phytopathology) in addition to the disproportionate processing times. Hence, image processing has been applied for the recognition of plant diseases. This paper has been divided into three main parts. In the first part, a comprehensive review based on algorithms is provided were the major algorithms and works conducted using image processing and artificial intelligence algorithms have been compared. The second part discusses the frameworks and compared the previous works. Then, a comprehensive discussion based on the accuracy of the results was provided. Based on the review conducted, a detailed explanation of the illnesses detection and classification performance is provided. Finally, the findings and challenges in plant leaf detection using image processing are summarized and discussed.

Source: https://mjsat.com.my/index.php/mjsat/article/view/80

A Novel Approach of Marine Ecosystem Monitoring System with Multi-Sensory Submarine on Robotic Platform for Visualizing the Climate Change Effect over Oceanic Environment

Author: AMINUN NAHAR et al.

Brief Description:

It is obvious that the whole world is so much concerned about the terrifying escalation of climate change in the recent time period. This climate change effect can be visible in the land, atmospheric and oceanic area simultaneously. Though there have been multiple attempts of proposing solutions concerning the protection for the land area environmental balance, monitoring and surveillance. But unfortunately there have been a very handful of research work which predominantly concerns about the protection upon the environmental state of marine biological species and its ecosystem. So, the following research study proposes a solution which appears to be a full-fledged Bluetooth controlled Submarine prototype with a sensory chipboard attached inside its endo-skeleton which contains multiple sensors like DHT11 temperature-humidity, dust, CO2 and YL69 pH sensors. The sensory data provides the information of underwater whether the naval environment is habitable for the marine biological species or not, under the terrible effect of global climate change. The submarine prototype is fully functional in the surface and underwater scenario which contains a very unique mechanical design and circuitry with an exceptional sensor data streaming capability which can be used by marine biological researchers and oceanographers professionally as a full-fledged marine ecosystem monitoring device.

Source: https://tis.wu.ac.th/index.php/tis/article/view/4205

COVID-19 and Sustainable Development Goals: Bangladesh Perspective

Author: MD. MORTUZA AHMMED et al.

Brief Description:

The objective of this study is to evaluate the state of the Sustainable Development Goals (SDGs) in Bangladesh before the arrival of COVID-19 along with its apparent impact on the accomplishment of SDGs in the future. Data from several national and international sources have been utilised to serve the analytical purpose of the study. Obliteration of the commendable accomplishments regarding some of the SDGs so far and resetting of the goals in terms of precedence are going to be the main consequences of COVID-19 concerning SDGs in Bangladesh which would impede attaining SDGs. However, constrictions in the production of industries along with a massive drop in fossil fuel usage through vehicles would give some respite to nature leading to notable progress regarding SDG 13, SDG 14 and SDG 15. But it would never recompense significantly for the overall effect resulting from COVID-19.

Source: https://www.inderscience.com/info/inarticle.php?artid=125098

Love as Water: Environmental Ethics in Ponyo and The Shape of Water

Author: SHIBAJI MRIDHA et al.

Brief Description:

Analyzing two films, Ponyo by Hayao Miyazaki and The Shape of Water by Guillermo del Toro, this paper studies the portrayal of humanity's complex relationship with water that refuses to present itself as static, simple, and reducible. Attending to water as a dynamic entity, it investigates the dynamics of value and agency of water in its manifested ally, rebel, and love. Engaging in the discussion of reciprocity as a way forward to a world of harmony, the paper argues how water as an equalizer can inform humans to shun their anthropocentric hubris and can help recognize the shared materiality between the human and the non-human world. Drawing on references from the recent scholarship on elemental ecocriticism, material ecocriticism, and environmental ethics, the eco-aesthetics of the films will be studied to evoke an ethical position about water's fluidity and omnipresence that demand our respect and our recognition of the agency of the non-human world.

Source: https://deh.ulab.edu.bd/publications/crossings/crossings-archive/2022-vol-13-no-2/mridha

Renewable Energy of Bangladesh for Carbon-free Clean Energy Transition (C2ET)

Author: ABU SHUFIAN et al.

Brief Description: At the beginning of the 21st -century global warming is one of the alarming issues that causes the imbalance of living beings' relations on Earth due to the increase of CO 2 and greenhouse gas on burning fossil fuels for electricity generation. With the effect of modernization and industrialization, Bangladesh and many countries worldwide generate power very rapidly from fossil fuels. Due to overuse, the world's fossil reserves will soon be depleted. Considering the above problems, Bangladesh needs to depend entirely on renewable energy (RE) to meet the growing electricity demand. The proposed C2ET strategy will pave the way for a bright future of green energy in Bangladesh, taking into account the various sources of recent power generation and the immense potential of RE. The model will make the entire country's energy system affordable and user-friendly by controlling it through an intelligent energy management system (EMS). The suggested strategy will formulate the future RE mix by thoroughly analyzing Bangladesh's ecological-environmental-economic systems. Following the outline, Bangladesh will meet its electricity demand from about 85% RE and 15% nuclear power by 2050. The power generated from RE will be used in any emergency condition as it will be stored on a short, medium, and long-time basis. There will be no need to generate electricity from fossils. Old and running fossil power plants will be gradually shut down. So, being a developed country, the carbon emissions tax on Bangladesh will no longer be effective. The suggested C2ET would be a ground-breaking and timely solution to preserve the world ecologically pleasant while also keeping up with the rising globalization system without jeopardizing the Earth's equilibrium.

Source: https://icaeee2022.com/

Smart Cable Fault Location Diagnosis System

Author: ABU SHUFIAN et al.

Brief Description: Repairing underground cable lines might be challenging due to a lack of a proper system for tracking the precise location of cable faults. Repairing wires of a defective cable becomes extremely difficult in the case of an underground fault because there is no way to locate the exact location of the fault. A microcontroller is used in this research study to investigate underground cable fault distance locators. It employs a straightforward interpretation of Ohm's law; the voltage drop might change depending on the length of the fault in the cable since the current varies. A group of resistors is used to represent the cable's length in kilometers. A DC voltage is put into one end of the cable, and the defect was identified using an analog to voltage converter when the voltage changed. The LCD displays the location of the defect as it interacts with the microcontroller that does the necessary calculations. Overhead cables were developed in recent years, but they are now laid as underground cables, which is superior to the earlier technique because the underground cables are not impacted by inclement weather like storms, snow, heavy rain, or pollution.

Source: http://www.r10htc2022.org/

Automatic Protection of Electrical and Gas Transmission System on Earthquake

Author: ABU SHUFIAN et al.

Brief Description:

A medium-sized or large earthquake can damage gas pipelines, electricity poles, and electrical components. Because there is a constant supply of gas and an active electricity supply, an active running system might result in gas explosions and electrical mishaps. This proposed model aims to create a device that can detect an earthquake of a particular Richter magnitude, trip electrical components, and automatically cut gas flow from the gas line by activating the solenoid valve during the earthquake. The safety system will automatically activate when the gadget senses that the ground is shaking at a 3.5 Richter scale. A microcontroller totally operates this system with the help of a relay and a solenoid valve. Implementation of the whole system was done successfully.

Source: https://ieeexplore.ieee.org/xpl/conhome/9864330/proceeding

Modeling & Economical Analysis of Hybrid Solar-Wind-Biomass-H2-based Optimal Islanding Microgrid in Bangladesh

Author: ABU SHUFIAN et al.

Brief Description:

Renewable energy systems are being developed to take the place of fossil-fuel-based energy systems in order to minimize the effects of global warming. Microgrid-based renewable energy generation has gained popularity on islands and in remote places worldwide. This paper proposes an optimal islanding microgrid system considering hybrid solar-wind-biomass-H2 storage components. The system consists of a mini solar hub, an onshore wind zone, and an anaerobic digester biogas plant with hydrogen energy storage. The suggested hybrid system is assessed based on its different intermittent natures, examining the alternation, uncertainty, and correlation of average daily solar, wind, and biogas output. Economic analysis and optimum control aspects are evaluated, with the ideal and practical operation configurations. Various plausible case studies demonstrate the usefulness of the proposed microgrid model. The real-time simulation demonstrates that the suggested hybrid system can effectively generate electricity for an isolated site in different environmental situations where the national grid is unavailable.