Energy Days Symposium

03-04 October 2022 / Sivas Cumhuriyet University, Türkiye

ABSTRACTS BOOK

EDITORS
Assist. Prof. Dr. Derya Betul UNSAL
Atabek MOVLYANOV

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SYMPOSIUM ID

SYMPOSIUM TITLE
International World Energy Conference

DATE and PLACE
December 3-4, 2021 / Kayseri, Turkey

PARTICIPATION
Keynote & Invited

ORGANIZATION
Renewable Energy Research Center Sivas Cumhuriyet University, Türkiye
Sustainability Office, Sivas Cumhuriyet University, Türkiye
IKSAD-Institute of Economic Development and Social Research, Türkiye

PARTICIPANTS COUNTRY
Türkiye, Oman, India, Iran, Iceland, Algeria, Morocco, France, Romania, Serbia, Tunisia, Saudi Arabia, Pakistan, Nigeria, UK,

Number Of Accepted Papers-**31**
Number Of Rejected Papers-**6**
The number of abstracts from foreign countries-**19**
The number of abstracts from Türkiye-**12**

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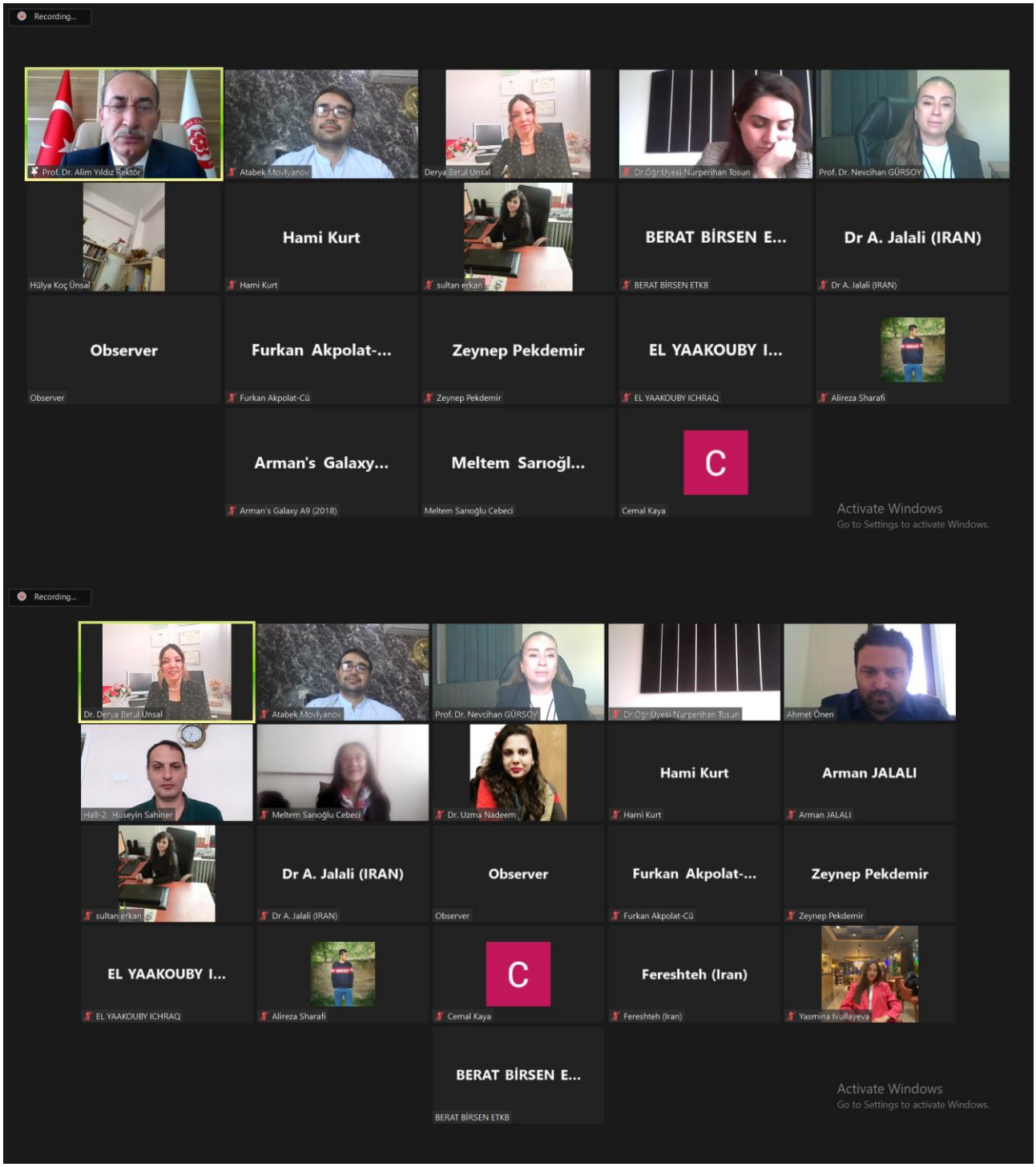
PHOTO GALLERY


Recording...
Prof. Dr. Alim Yıldız Rektör
Atabek Movlyanov
Derya Betul Unsal
Dr.Öğr.Üyesi Nurperihan Tosun
Prof. Dr. Nevcihan GÜRSOY
Hülya Koç Ünsal
Hami Kurt
sultan erkan
BERAT BİRSEN E...
Dr A. Jalali (IRAN)
Observer
Furkan Akpolat-...
Zeynep Pekdemir
EL YAAKOUBY I...
Alireza Sharafi
Arman's Galaxy...
Meltem Sarıoğl...
C
Cemal Kaya
Activate Windows
Go to Settings to activate Windows.
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Dr. Derya Betul Unsal
Atabek Movlyanov
Prof. Dr. Nevcihan GÜRSOY
Dr.Öğr.Üyesi Nurperihan Tosun
Ahmet Önen
Halil-2 Hüseyin Sahiner
Meltem Sarıoğlu Cebeci
Dr. Uzma Nadeem
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C
Cemal Kaya
Fereshteh (Iran)
Yasmina Ivullayeva
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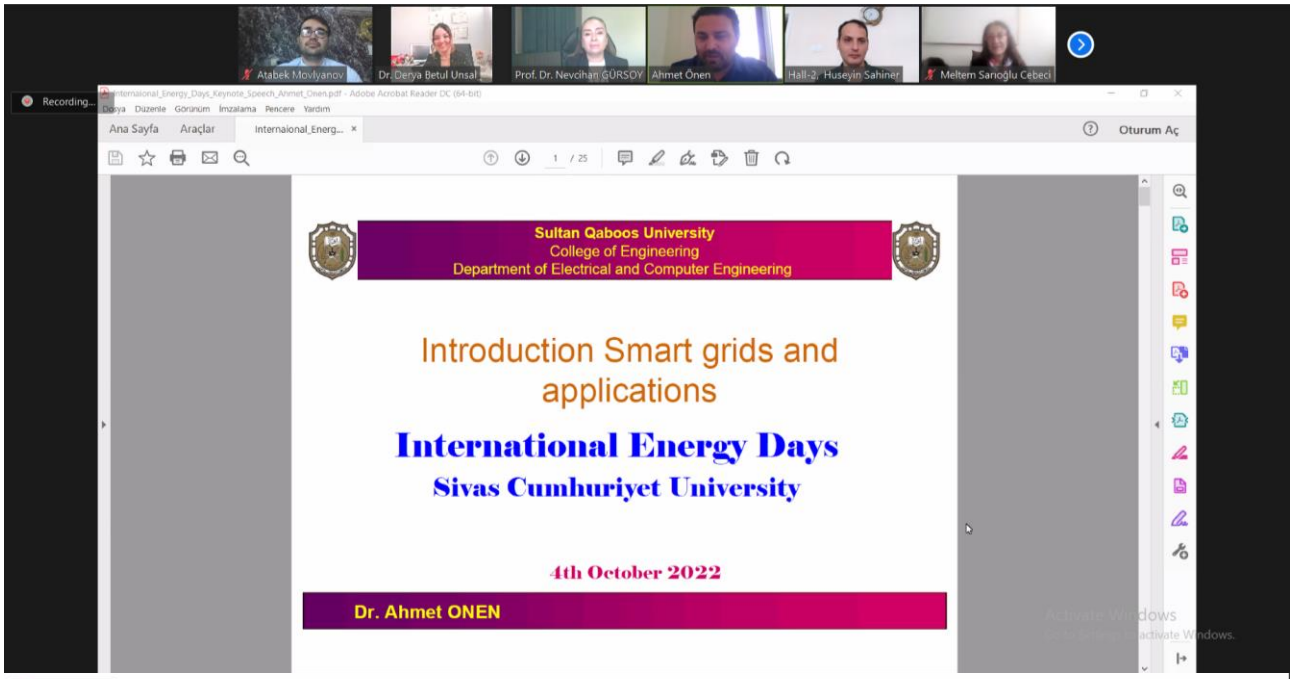
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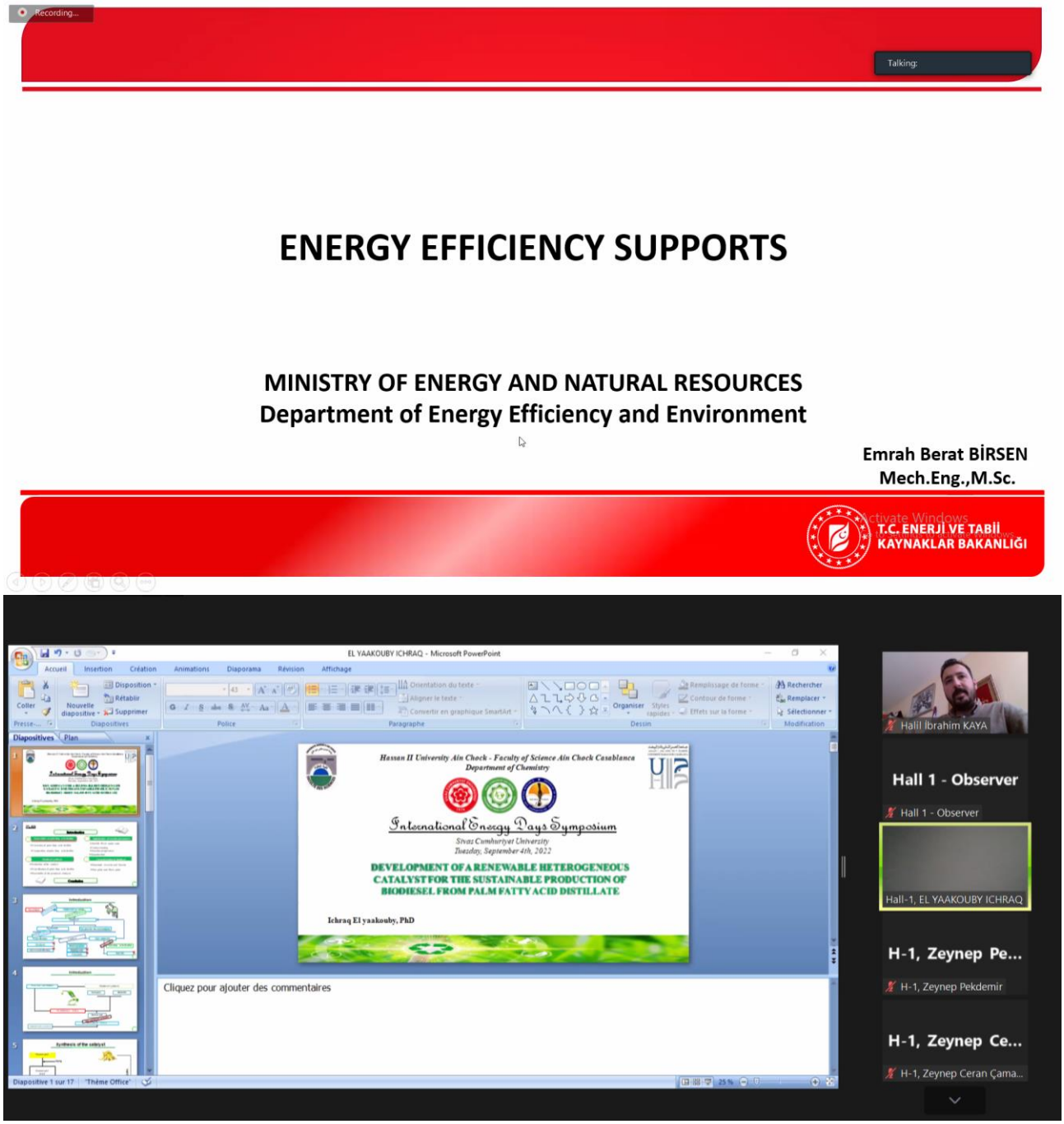
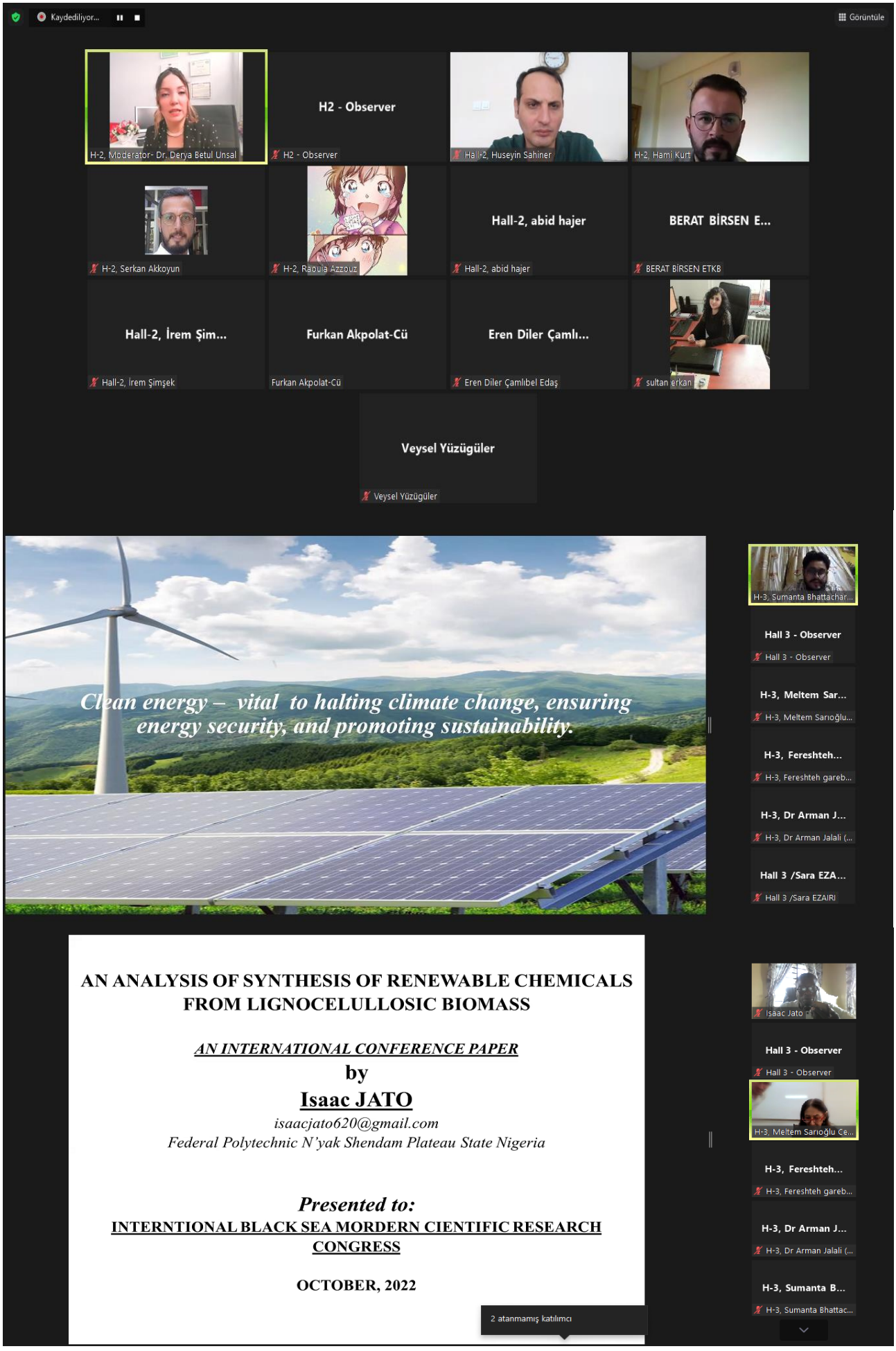
Dr. Derya Betul Unsal
Prof. Dr. Nevcihan GÜRSOY
Ahmet Önen
Hall-2, Huseyin Sahiner
Meltem Sarioğlu Cebeci
Recording...
Ana Sayfa
Araçlar
Oturum Aç
Sultan Qaboos University
College of Engineering
Department of Electrical and Computer Engineering
Introduction Smart grids and applications
International Energy Days
Sivas Cumhuriyet University
4th October 2022
Dr. Ahmet ONEN


Recording...
Talking: Dr. Derya Betul Unsal
Waste-to-Energy in Worldwide: Current and Future sustainable technologies
PROF. DR. MELTEM SARIOĞLU CEBECİ
SİVAS CUMHURİYET UNIVERSITY
FACULTY OF ENGİNEERİNG, DEPARTMENTOF
ENVIRONMENTAL ENG
SARİOGLU@CUMHURİYET.EDU.TR
ENERGY DAYS 4 OCTOBER 2022, SİVAS /TURKEY


Recording...
Talking:
ENERGY EFFICIENCY SUPPORTS
MINISTRY OF ENERGY AND NATURAL RESOURCES
Department of Energy Efficiency and Environment
Emrah Berat BİRSEN
Mech.Eng.,M.Sc.
T.C. ENERJİ VE TABİİ KAYNAKLAR BAKANLIĞI
EL YAAKOUBY ICHRAQ - Microsoft PowerPoint
Hassan II University Ain Chock - Faculty of Science Ain Chock Casablanca
Department of Chemistry
International Energy Days Symposium
Sivas Cumhuriyet University
Tuesday, September 4th, 2022
DEVELOPMENT OF A RENEWABLE HETEROGENEOUS CATALYST FOR THE SUSTAINABLE PRODUCTION OF BIODIESEL FROM PALM FATTY ACID DISTILLATE
Ichraq El yaakouby, PhD
Cliquez pour ajouter des commentaires
Halil İbrahim KAYA
Hall 1 - Observer
Hall 1 - Observer
Hall-1, EL YAAKOUBY ICHRAQ
H-1, Zeynep Pe...
H-1, Zeynep Pekdemir
H-1, Zeynep Ce...
H-1, Zeynep Ceran Çama...


CYBER SECURITY
Cyber security; it is a comprehensive term that includes the protection of critical information infrastructure from hackers, as well as what is considered critical information infrastructure, such as small and medium-sized businesses' information networks or personal computers.
It aims to prevent malicious cybernetic events affecting critical information infrastructures and non-critical information infrastructures. These malicious cybernetic events include, for example, attacks, spam, phishing, and other cybernetic events.
It consists of the development of a cybernetic code of conduct for the appropriate use of information and communication technology and the dissemination of an original security policy that sets the standards for cybersecurity users.
Hall-1, EL YAAKOUBY ICH...
Hall 1 - Observer
Hall 1 - Observer
H-1 : Session Moderator ...
H-1, Zeynep Pekdemir
Bahadir Erman YÜCE
INTERNATIONAL ENERGY DAYS
3 - 4 OCTOBER 2022 - HYBRID
Dr. Derya Betul Unsal
H2 - Observer
H2 - Observer
Atabek Movlyanov
H-3, Meltem Sarıoğlu Ce...
H-3, Sumanta B...
H-3, Sumanta Bhattac...
H-1- Dr. Uzma Nade...


Kaydediliyor...
Görüntüle
H-2, Moderator- Dr. Derya Betul Unsal
H2 - Observer
H2 - Observer
Hall-2, Huseyin Sahiner
H-2, Hami Kurt
H-2, Serkan Akkoyun
H-2, Raouia Azzouz
Hall-2, abid hajer
Hall-2, abid hajer
BERAT BİRSEN E...
BERAT BİRSEN ETKB
Hall-2, İrem Şim...
Hall-2, İrem Şimşek
Furkan Akpolat-Cü
Furkan Akpolat-Cü
Eren Diler Çamlı...
Eren Diler Çamlıbel Edaş
sultan erkan
Veysel Yüzügüler
Veysel Yüzügüler
Clean energy – vital to halting climate change, ensuring energy security, and promoting sustainability.
H-3, Sumanta Bhattachar...
Hall 3 - Observer
Hall 3 - Observer
H-3, Meltem Sar...
H-3, Meltem Sarıoğlu...
H-3, Fereshteh...
H-3, Fereshteh gareb...
H-3, Dr Arman J...
H-3, Dr Arman Jalali (...
Hall 3 /Sara EZA...
Hall 3 /Sara EZAIRI
AN ANALYSIS OF SYNTHESIS OF RENEWABLE CHEMICALS FROM LIGNOCELULLOSIC BIOMASS
AN INTERNATIONAL CONFERENCE PAPER
by
Isaac JATO
isaacjato620@gmail.com
Federal Polytechnic N'yak Shendam Plateau State Nigeria
Presented to:
INTERNTIONAL BLACK SEA MORDERN CIENTIFIC RESEARCH CONGRESS
OCTOBER, 2022
2 atanmamış katılımcı
Isaac Jato
Hall 3 - Observer
Hall 3 - Observer
H-3, Meltem Sarıoğlu Ce...
H-3, Fereshteh...
H-3, Fereshteh gareb...
H-3, Dr Arman J...
H-3, Dr Arman Jalali (...
H-3, Sumanta B...
H-3, Sumanta Bhattac...

INTERNATIONAL ENERGY DAYS

Sivas Cumhuriyet University
Tuesday, October 4th, 2022

Symposium Programme

Meeting ID: 954 7649 3631
Passcode: 102022

Important, Please Read Carefully

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exp. Hall-1, Ethem KILIÇ

-Welcome Greetings -

Date- 04.10.2022

All schedule is according to GMT +3 time zone (Istanbul)

Assist. Prof. Dr. Derya Betul UNSAL- (10.00-10.10)

Director of Renewable Energy Research Center and

Coordinator of Sustainability Office in Sivas Cumhuriyet University, Turkey

Symposium Organizing Committee Chair

Prof. Dr. Alim YILDIZ- (10.10-10.30)

Sivas Cumhuriyet University Rector

Symposium Honorary Chair

-Keynote Speeches-

Date- 04.10.2022

All schedule is according to GMT +3 time zone (Istanbul)

Prof. Dr. Ahmet ONEN- (10.30-11.00)
Sultan Qaboos University, Oman
-/-
Dr. Abdullah Buğrahan KARAVELİ- (11.00-11.20)
Ministry of Energy and Natural Resources,
Head of the Department of Energy Efficiency and Environment (EVÇED), Turkiye
-/-
Prof. Dr. Meltem SARIOĞLU CEBECİ- (11.20-11.40)
Sivas Cumhuriyet University, Turkiye
-/-
Assist. Prof. Dr. Meryem Seferinoğlu-(11.40-12.00)
Sinop University, Türkiye
-/-
Assist. Prof. Dr. Uzma Nadeem-(12.00-12.20)
Environmental Studies of Mata Sundri College for Women, University of Delhi, India
-/-
Mechanical engineer, M.Sc. Emrah Berat BİRSEN-(12.20-12.40)
Ministry of Energy and Natural Resources,
Consultant Mechanical Engineer Energy Manager, Turkiye
-/-
Assist. Prof. Dr. Arman JALALI (12.40-13.00)
Tabriz University, Iran
-/-
Assist. Prof. Huseyin Sahiner-(13.00-13.20)
Sinop University, Türkiye
-/-
Prof. Zhao Yuan-(13.20-13.40)
University of Iceland, Iceland
-/-
Prof. Dr. Nevcihan GÜRSOY-(13.40-14.00)
Head of Graduate Institute of Natural and Applied Sciences
Sivas Cumhuriyet University, Turkiye

04.10.2022 / Hall-1 / TSI Time - 14^{30}:16^{30}

Zoom ID: 954 7649 3631 / Passcode: 102022

Moderator: Assist. Prof. Dr. Uzma Nadeem

Authors	Affiliation	Presentation title
Assoc. Prof. Dr. Yassine YAKHELEF **Assoc. Prof. Dr. Fares NAFA**	Boumerdes University, Algeria	ADAPTIVE MPPT CONTROL OF MULTILEVEL CONVERTER BASED SOLAR MICROGRID SYSTEM USING ANFIS ALGORITHM
Ichraq El yaakouby **Youness Abouliatim** **Miloudi Hlaibi** **Nourredine Kamil**	Hassan II University of Casablanca (UH2C), Morocco National School of Applied Sciences, Safi, Morocco University of Rouen, France	DEVELOPMENT OF A RENEWABLE HETEROGENEOUS CATALYST FOR THE SUSTAINABLE PRODUCTION OF BIODIESEL FROM PALM OIL DISTILLATE
Halil İbrahim KAYA **Şerife Merve KOŞAROĞLU**	Sivas Cumhuriyet University, Türkiye	THE RELATIONSHIP OF ENERGY IMPORTS, CURRENT DEFICIT AND ECONOMIC GROWTH: THE CASE OF TURKEY
Yağmur Arıkan Yıldız	Sivas Cumhuriyet University, Türkiye	ENERGY EFFICIENCY WITH REGENERATIVE ENERGY UTILIZATION METHOD IN RAIL SYSTEM VEHICLES
Andrei Sărăcuţ-Ardelean **Marius Lolea** **Kristijan Cincar**	University of Oradea, Romania Školski centar "Nikola Tesla", Serbia	ENERGY COST AND ENERGY EFFICIENCY STATUS OF BUILDINGS USING HEAT PUMPS
Mustafa ŞEKER	Sivas Cumhuriyet University, Türkiye	OPTIMAL CAPACITOR PLACEMENT DEPENDING ON SYSTEM CONFIGURATION IN RADIAL ELECTRIC SYSTEMS USING NOVEL ARTIFICIAL HUMMINGBIRDS ALGORITHM (AHA)
Dr. Marius LOLEA **Dr. Cornelia ANGHEL-DRUGARIN** **Eng. Daniela NEGREA**	University of Oradea, Romania University"Babeş – Bolyai" of Cluj Napoca, Romania	NEW CHALLENGES IN REDUCING THE ECONOMIC AND SOCIAL IMPACTS OF ENERGY CRISIS IN ROMANIA
Assit. Prof. Dr. Bahadır Erman Yüce **Serkan ÖZEL**	Bitlis Eren University, Türkiye	THERMAL ANALYSIS OF CERAMIC COATED EXHAUST MANIFOLD
Zeynep CERAN ÇAMAYAZ **Derya Betül ÜNSAL**	Sivas Cumhuriyet University, Türkiye	ENERGY EFFICIENT SMART BUILDING SOLUTIONS FOR GRID CONNECTED SMART GRIDS
Derya Betül ÜNSAL **Zeynep PEKDEMİR**	Sivas Cumhuriyet University, Türkiye	PROTECTION OF MICROGRIDS WITH RENEWABLE CONNECTION
Assist. Prof. Dr. Sovik Mukherjee	St. Xavier's University, India	THE ROLE OF INCENTIVES IN RENEWABLE ENERGY POLICIES IN EUROPEAN COUNTRIES: SPECIAL EMPHASIS ON WHAT INDIA CAN LEARN

04.10.2022 / Hall-2 / TSI Time - 14^{30}:16^{30}

Zoom ID: 954 7649 3631 / Passcode: 102022

Head of Session: Assist. Prof. Dr. Derya Betül ÜNSAL

Authors	Affiliation	Presentation title
Kübra Harman **Muhammed Mustafa Orhan** **Serkan Akkoyun**	Sivas Cumhuriyet University, Türkiye	ESTIMATING THE NET CAPACITIES OF REACTORS WITH ARTIFICIAL NEURAL NETWORKS
Dr. Marius LOLEA **Dr. Cornelia ANGHEL-DRUGARIN** **Eng. Daniela NEGREA**	University"Babeş – Bolyai" of Cluj Napoca, Romania University of Oradea, Romania	FINANCIAL COSTS OF IMPROVEMENT THE ENERGY EFFICIENCY OF INSTALLATIONS FOR BUILDINGS
Dr. Marius LOLEA **Andrei SĂRĂCUȚ-ARDELEAN** **Kristijan Cincar**	University of Oradea, Romania Školski centar "Nikola Tesla", Serbia	CONTRIBUTION OF SMART CONTROL TO INCREASING THE ENERGY EFFICIENCY OF BUILDINGS
Hami KURT **Derya Betül ÜNSAL**	Sivas Cumhuriyet University, Türkiye	ELECTROMAGNETIC FIELD LEVELS ANALYSIS FOR GRID CONNECTED SMART DEVICES
Mohamed Dhia Massoudi **Mohamed Bechir Ben Hamida**	University of Monastir, Tunisia Ibn Saud Islamic University (IMSIU), Saudi Arabia University of Sousse, Tunisia	NUMERICAL STUDY OF COMBINED EFFECTS OF RADIATIVE NANOFLUID AND FINS ARRAGEMENTS CASES ON HEAT SINK EFFICIENCY
Hajer ABID **Mohamed Bechir BEN HAMIDA**	University of Monastir, Tunisia Ibn Saud Islamic University (IMSIU), Saudi Arabia University of Sousse, Tunisia	A NEW DESIGN OF A HYBRID SYSTEM FOR SOLAR-POWERED WATER DESALINATION
Raouia AZZOUZ **Mohamed Bechir BEN HAMIDA**	University of Monastir, Tunisia Ibn Saud Islamic University (IMSIU), Saudi Arabia University of Sousse, Tunisia	THREE- DIMENSIONAL HEAT TRANSFER STUDY OF SHELL AND TUBE HEAT EXCHANGER
Assist. Prof. Huseyin Sahiner	Sinop University, Türkiye	WASTE ESTIMATION FOR BREEDER TYPE MOLTEN SALT REACTORS
Gahgah Mounir **Bouzaouit Azzedine** **Rahai Ilyes**	University of August 20, 1955, Algeria	STATISTICAL ANALYSIS FOR THE STUDY OF THE RELIABILITY OF A DIFFERENTIAL FILTER
İrem ŞİMŞEK **Ahmet UYAROĞLU** **Tayfun TURAL** **Eren DİLER** **Yunis TORUN** **Burak SEÇKİN** **Bünyamin ÇAM**	Sivas Cumhuriyet University, Türkiye	YER ALTI ENERJİ HATLARINDA GÜZERGAH TESPİT CİHAZLARININ GÜNCEL DURUMU VE GELECEĞİ

04.10.2022 / Hall-3 / TSI Time - 14^{30}:16^{30}

Zoom ID: 954 7649 3631 / Passcode: 102022

Moderator: Prof. Dr. Meltem Sarıoğlu Cebeci

Authors	Affiliation	Presentation title
Sefa Furkan Selçuk **Zinnur Yılmaz** **Berk Köker** **Prof. Dr. Meltem Sarıoğlu Cebeci**	Sivas Cumhuriyet University, Türkiye	PRIMARY ENERGY CONSUMPTION: CROSS-COUNTRY TREND ANALYSIS
Haseeb Ur Rehman **Arslan Khalid** **Danish Zaman** **Muhammad Irfan** **Ghulam Murtaza**	University of Engineering and Technology, Pakistan Swedish College of Engineering and Technology, Pakistan	DESIGN AND FABRICATION OF WIND TREE TURBINE BLADE
Berk Köker **Prof. Dr. Meltem Sarıoğlu Cebeci** **Zinnur Yılmaz** **Sefa Furkan Selçuk**	Sivas Cumhuriyet University, Türkiye	CLEAN ENERGY GENERATION FROM PRESSURE RETARDED OSMOSIS WITH OSMOTIC POWER
Dr. Sara EZAIRI **Dr. Assaad ELOUAFI** **Prof. Dr. Fatima LMAI**	Hassan II University of Casablanca, Morocco	OPTICAL PROPERTIES, INFLUENCE OF THE POLARIZATION AND THE TEMPERATURE ON HETEROJUNCTION ORGANIC SOLAR CELL
Isaac JATO	Federal Polytechnic N'yak Shendam, Nigeria	AN ANALYSIS OF SYNTHESIS OF RENEWABLE CHEMICALS FROM LIGNOCELULLOSIC BIOMASS
Dr. Sumanta Bhattacharya	Maulana Abul Kalam Azad University of Technology, India	CLEAN ENERGY – VITAL TO HALTING CLIMATE CHANGE, ENSURING ENERGY SECURITY, AND PROMOTING SUSTAINABILITY
Prof. Dr. Valentina MARINESCU **Dr. Bianca FOX** **Dr. Ramona MARINACHE**	University of Bucharest, Romania Nottingham Trent University, UK	COMMUNICATION AND RESPONSIBILITY ABOUT OIL AND GAS USING YOUTUBE
Dr. Ramona MARINACHE **Prof. Dr. Valentina MARINESCU** **Dr. Bianca FOX**	University of Bucharest, Romania Nottingham Trent University, UK	NARRATIVES OF THE ENERGY CRISIS IN ROMANIA
Dr. Olaore Kayode Olatunde **Prof. Danshehu Bagudu Gwadangwaji** **Usman Abdulkarim** **Dr. Sunday Abayomi John**	Kwara State Polytechnic, Nigeria Usmanu Danfodiyo University, Nigeria	ELECTRICITY GENERATION USING A CENTRIFUGAL PUMP WITH AN OPEN IMPELLER AS TURBINE IN REVERSE MODE
Fereshteh Gharehbaghi Maleki **Mousa Mohammadpour Fard** **Arman Jalali**	University of Tabriz. Iran	BIOGAS PRODUCT SIMULATION USING ADM1 AND FEASIBILITY STUDY OF USING BIOGAS IN A POWER GENERATION UNIT WITH ASPEN PLUS

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Adaptive MPPT Control of Multilevel Converter Based Solar Microgrid System Using Anfis Algorithm

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ABSTRACT

Photovoltaic systems are used to convert solar energy into electrical energy. They consist of a PV cell array that uses the sunlight to generate direct current (DC) power with a known lower conversion efficiency rate. In order to maximize the efficiency of energy conversion of these systems, a technique of using a maximum power point tracking (MPPT) algorithm is developed to deliver maximum power from the photvoltaic (PV) panel to the load regardless of the intensity of the sunlight or of temperature or any weather condition. The main objective of this work is to improve the efficiency of the PV systems by designing and comparing two Maximum Power Point Tracker (MPPT) Controllers that improve the efficiency of solar energy conversion system built around the Modular Multilevel power converter and connected to utility Grid. These MPPT controllers are Adaptive Neuro Fuzzy Inference System (ANFIS) and Perturbation and Observation algorithm, which are simulated using Matlab/Simulink to show their performances as well as their behaviour at different weather condition of temperature and irradiance variation.

Key Words: Solar energy system, Microgrid, Modular Multilevel Converter, MPPT, ANFIS, Perturb and Observe algorithm

Development of a renewable heterogeneous catalyst for the sustainable production of biodiesel from palm oil distillate

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ABSTRACT

Due to the rapid depletion of fossil fuel resources and environmental problems associated with toxic emissions from conventional diesel, biodiesel has received increased attention in recent times as a renewable fuel, environmentally friendly and sustainable energy source. In the present study, a solid carbon-based heterogeneous acid catalyst was developed for the production of biodiesel from the by-product of fatty acid-rich palm oil refining (PFAD) through the esterification reaction. The stability of the catalyst and the effects of temperature, reaction time, methanol to PFAD ratio, and catalyst loading on the production efficiency were examined individually. The experimental results confirmed that the acid catalyst efficiently converted the fatty acids in the palm oil distillate to methyl ester. With a maximum conversion of 96% under the optimum conditions (reaction temperature of 70°C, reaction time of 3h, methanol : PFAD of 15:1, and catalyst loading of 3% by weight). In addition, the catalyst was successfully reused up to 3 cycles. Furthermore, the fuel properties of the biodiesel produced are within the limits prescribed by the international standard. It can be concluded that the carbon-based acid catalyst is reusable and has proven to be a very efficient and environmentally friendly catalyst. It has a strong potential to esterify high fatty acid feedstocks, mainly palm oil distillate, to produce a sustainable and low cost biodiesel.

Keywords : PFAD, Heterogeneous catalyst, Esterification, Sustainable biodiesel

The Relationship of Energy Imports, Current Deficit and Economic Growth: The Case of Turkey

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ABSTRACT

The developments in the world economy, the globalizing economic structure, the increase in the population, the acceleration of technological advances cause the energy demand to increase regularly. The need for energy resources is not realized at the same level for every country. As a result of the unequal distribution of energy resources, it makes energy imports compulsory for many countries. High energy imports cause significant imbalances in macroeconomic level as well as energy supply security. Countries with high energy imports are adversely affected by fluctuations in energy prices, especially current account deficit and economic growth. In this context, Turkey's current account deficit, whose economic growth potential has changed over the years, has become a chronic problem. Considering the high share of energy imports in total imports, the relationship between these variables seems important. For this reason, in the related study, the relationship between Turkey's energy imports, current account deficit and economic growth variables for the years 1974-2015 was investigated by NARDL method. According to the results of the analysis, positive shocks in energy imports have a positive effect on the current account deficit, while negative shocks have a negative effect on the current account deficit. In addition, there is an inverse relationship between the current account deficit and economic growth. Considering the results, it is important to expand renewable energy production in Turkey. This situation, which will reduce energy imports, will play a major role in ensuring economic stability.

Keywords—Energy Imports, Current Account Deficit, Economic Growth, NARDL.

Energy Efficiency with Regenerative Energy Utilization Method in Rail System Vehicles

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ABSTRACT

Rail systems are one of the most frequently used public transportation vehicles, especially in metropolitan cities, due to their many advantages such as being punctual, reliable and economical, and having high capacity. Energy efficiency in rail systems has become an important issue because of increasing in rail networks, intensive operation of vehicles and the growth of the rail system market. Since rail systems have a complex structure, many methods are used in the literature to ensure energy efficiency in these systems. One of the prominent method among all methods is the the utilization of regenerative energy. Regenerative energy, or in other words, regenerative braking is the kinetic energy that emerges when the vehicle is braking up to a certain speed and is generally lost in most systems by burning it into heat energy. This energy can be stored and used later by saving it into energy storage systems, or it can be used immediately by giving it back to the line with time optimization or reversible substations. In this study, the methods used in the effective use of this energy in the literature have been investigated and classified. A general evaluation has been made by comparing these methods in terms of their contribution to energy efficiency and cost effects.

Keywords—rail systems, energy efficiency, regenerative energy, energy storage systems, timetable optimization, reversible substation

Energy Cost and Energy Efficiency Status of Buildings Using Heat Pumps

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ABSTRACT

The authors present in this paper, the results of their own research regarding the costs of energy obtained on the basis of heat pumps that are used for heating and cooling spaces in buildings. Various stages of energy efficiency are also analyzed for several categories of heat pumps used in buildings and comparisons are made with other heating and cooling systems. Are highlighted the advantages and disadvantages of energy systems of buildings using heat pumps, with the establishment of their technical and economic implications.

After the introductory part, an analysis is made of the constructive characteristics and the mode of operation of the heat pumps. Several categories of heat pumps are compared from a technical point of view, such as: water-water, soil-water, air-air, water-air. With a dedicated software, simulations are made regarding the operation, energy consumption and efficiency of various types of heat pumps. For the analyzed heat pumps, a market study is also carried out by category, in order to determine the purchase prices for the same thermal power per unit. From the technical characteristics offered by the manufacturer, each pump category will be ranked based on energy efficiency and financial implications.

The paper also presents the results of the study of the integration and operation of the heat pumps in several residential buildings that the authors visited in order to establish their energy status. At the end of the paper, observations will be made regarding the profitability and efficiency of heat pumps. The authors' conclusions and recommendations regarding the integration of heat pumps in buildings are presented. These are focused especially on the financial savings brought by heat pumps, which have the technical advantage that they can work reversibly, that is, they can also produce cold, without the need for additional devices, thus being able to be integrated into the air conditioning systems of buildings.

Keywords: Energy cost, Energy efficiency, Heat pumps.

Optimal Capacitor Placement Depending on System Configuration in Radial Electric Systems using Novel Artificial Hummingbirds Algorithm (AHA)

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ABSTRACT

While transferring electrical energy from the point where it is produced to the end consumer; In addition to the continuity of the transmitted power, it is desired that the supplied voltage is at a certain frequency value and within the desired fluctuation limits. Electricity transmission and distribution systems are operated in a radial structure, although they are designed in the ring structure, to ensure that the minimum consumer is de-energized and energy continuity in case of failure at any point of the system. This study presents a novel algorithm for a system configuration-dependent approach to determine capacitors' optimal positions and sizes using Artificial Hummingbirds Algorithm (AHA) in radial distribution systems. The analysis is aimed to determine the optimum capacitor locations and sizes for fixed and switched capacitors. To solve this problem; the Radial system losses according to electrical system constraints have been configured using load sensitivity index and Backward/Forward Sweep algorithm. Artificial Hummingbirds Algorithm (AHA) was used to determine optimal switching positions. In addition, the obtained results were compared with the calculations obtained by genetic algorithm and particle swarm optimization. The simulation findings reveal that the Artificial Hummingbirds Algorithm (AHA) is a more efficient tool for the minimization of losses, voltage profiles, and costs in distribution systems. The presented strategy is recommended for planning radial systems and prioritizing investments.

Keywords— Optimal Capacitor Placement, Artificial Hummingbirds Algorithm (AHA), Radial System Reconfiguration, Genetic Algorithm (GA), Particle Swarm Optimization (PSO)

New Challenges in Reducing the Economic and Social Impacts of Energy Crisis in Romania

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ABSTRACT

The paper follows two directions: economic and social, both under the influence of the energy and fuel crisis. Starting from the year 2020, in Romania, as in other countries in Europe or in the world, a great energy and fuel crisis was triggered, which had and still has a strong economic and social impact by increasing prices. In Romania, the conflict situation in Ukraine has increased this crisis. Also, the pandemic period generated changes in the labor market and salary fluctuations, layoffs or new jobs that could be performed from home.

The year 2022 led to the biggest increases in energy and fuel prices and triggered fears among the poor population who perceive the future as uncertain. In order not to affect social life at a very negative level, the government had to generate and adopt a series of fiscal measures. These include: subsidizing part of the price of fuel sold to the population, imposing ceilings on electricity and natural gas prices, direct financial aid to some vulnerable social categories such as people with low incomes, encouragement through tax reduction for companies that employ people with increased social risk, etc

The authors conducted research in public databases, government reports or on various markets to identify the degree of price increase and which products were most affected by the crisis. The evolution of inflation, which reached the highest value in the last 10 years, was also analyzed. Other situations researched by the authors are focused on the impact on the purchasing power of Romanians and the aid to refugees from Ukraine, including the possibility of absorption on the Romanian labor market of Ukrainians who left their country. At the end of the paper, are presented the most important conclusions resulting from the study.

Keywords: Energy crisis, fuels prices, ecomonic impact, social life

Thermal Analysis of Ceramic Coated Exhaust Manifold

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ABSTRACT

Exhaust manifolds have an essential role in safely removing waste gases after combustion in internal combustion engines. The exhaust manifold is subjected to thermal stress as the exhaust gases carry a high thermal load. In order to prevent damage to the manifold as a result of these loads, the coating process which is an engineering solution is applied and a thermal barrier is obtained on the manifold. In this study, the thermal analysis of the exhaust manifold covered with 500µ ZrO2-Y2O3 ceramic material under convective thermal loads was investigated. The study was performed with ANSYS-Fluent, a commercial Computational Fluid Dynamics (HAD) software. The insulating performance of the coating material with a low thermal conductivity coefficient was compared with an uncoated manifold. It was observed that ZrO2-Y2O3 significantly reduced the thermal loads on the manifold. As a result, the temperature values on the outer surface of the manifold coated with ZrO2-Y2O3 decreased compared to the uncoated manifold.

Keywords: Coating, ZrO_2-Y_2O_3, Manifold, Thermal Analysis.

Energy efficient solutions for grid-connected smart buildings

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ABSTRACT

Today, in the technological field, innovations are made and developed day by day in line with the increasing population and needs. With the technological activities that have developed in the last 20 years, environmentally friendly, sustainable buildings that provide optimum comfort to users and minimize the use of energy from external sources have begun to be developed. Demand for smart buildings has increased due to the fact that they respond to the needs and requirements of users, have a long life and are low cost. A smart building is an independent structure with air conditioning, ventilation, lighting and security systems that can manage itself. It should be integrated with renewable energy sources, which have become a necessity to use, and turn them into green, sustainable and environmentally friendly buildings. There are many parameters required for buildings to be smart. In this study, the requirements and usage areas of smart buildings according to different standards have been determined. The building efficiency of the devices used in the construction of smart buildings and the solutions required for the use of smart buildings to be environmentally friendly and energy efficient have been researched.

Keywords—Smart Grid, Smart Buildings, Renewable Integration.

Protection of Microgrids with Renewable Integration

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ABSTRACT

Smart grids aim to control electricity generation-transmission-distribution systems by using electronic communication for reliable and efficient energy supply. In today's world, where the availability of renewable energy sources is increasing, the transition to renewable energy at the macro level with its integration into smart grids is of great importance. The reliability of a smart grid is based on the reliability of its control and communication systems. As communication systems become more complex to provide better control and high reliability, smart grids require a higher degree of connectivity to external networks to support new features. However, dependence on these external networks also brings with it cyber security vulnerabilities and breaches. Therefore, these connections must meet the requirements of various standards developed within the scope of cyber security requirements. In this study, the proposals for providing cyber security in renewable energy sources in smart grids and resolving attacks that threaten this security are discussed. By mentioning the importance of cyber security today, the types of attacks that threaten this security, the solutions produced for these attacks and the problems that may arise in these solutions, the importance of cyber security in energy systems is emphasized.

Keywords—Smart Grid, Micro Grid, Cyber Security, Renewable Integration.

The Role of Incentives in Renewable Energy Policies in European Countries: Special Emphasis on what India can Learn

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ABSTRACT

This study focuses on the evaluation of the main energy scheme policies that promote electric renewable energy production. In particular, the objective is to analyse heterogeneous non-hydroelectric RES-E (solar, wind, geothermal and biomass) support scheme policies common in the European countries and evaluate their effects on promoting capacity and production of electricity in twenty-seven European countries for the years 2000- 2019.

To this end, we investigate the relative effectiveness of premium (FIP), fixed- price (FIT) and quota (RPS) incentives, taking into account the timing of adoption of these policies, by applying panel data analysis. The results suggest that price-based incentives (FIP and FIT), compared to the quantity-based incentives (RPS), are the most effective kind of incentive mechanisms for promoting development of non-hydroelectric renewable energy technologies in the EU context. One novelty result of the research concerns the strong incidence of feed-in premium (FIP). In fact, for countries adopting FIP incentives, the production of electric energy from renewable technologies register better performances compared to those adopting FIT and RPS. The paper comes to a close by highlighting the effectiveness of such policies in bringing about a new renewables based "Industrial Revolution" in the Indian context.

Key words: renewable electric sources; energy policy; feed-in tariffs; feed-in premium; renewable portfolio standard; panel data analysis.

JEL classification: Q42; O33, Q48; 052

Estimating The Net Capacities Of Reactors with Artificial Neural Networks

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ABSTRACT

The electricity consumption needed in all countries is increasing with the developing industry. Energy production is obtained from different sources as well as from Nuclear Power Plants. Recently, the decrease in fossil fuels and climate changes due to harmful gases released to the environment have increased the interest in Nuclear Power Plants. For this reason, newly developing countries want to meet their electricity needs with nuclear energy. The aim of this study is to determine the net capacity that can be obtained from a reactor according to the type of reactor needed by the countries by using artificial neural networks. Thus, it will be possible to predict whether the energy production capacities requested by the countries can be met with the reactors built. According to the data received from the IAEA (International Atomic Energy Agency), the artificial neural network model is used to predict whether the reactor to be built will meet the electricity demand in the country. It is seen that the determination of the net capacity of the reactors to be built according to the obtained data can be estimated safely by using this method.

Keywords— Artificial neural network, nuclear reactors, electricity need, net capacity

Financial Costs of Improvement the Energy Efficiency of Installations for Buildings

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ABSTRACT

The paper presents details from the authors' investigations regarding the costs required in Romania for raising the energy performance of buildings and especially for making buildings more efficient. To increase energy efficiency, certain solutions are needed that require significant investments in people's personal homes. Therefore, in order to highlight them in the paper, we deal with the following issues:

• Evaluation of energy consumption for electricity and heat of installations in buildings in Romania;

• The expenses necessary to modernize the houses on the energy side, including thermal insulation;

• Investment depreciation calculations;

• Preparation of expense reports that can serve other investors to go through the same stages so that it can be established what is the purpose of the investments in the rehabilitation of the buildings and how they can be amortized/recovered.

At the end of the paperwork, following the analyzes performed, the authors formulated the conclusions that resulted from the study.

Among the principles of energy efficiency in buildings, we mention in the paper: an important condition for achieving interior comfort is the provision of the building with a heating system that provides heat during the cold season. The heat supplied must be maintained inside the building, so that the energy consumption of the heating system is the minimum necessary. But the characteristic of thermal energy transfer (or heat, popularly called "heat transfer") is that it is generated by any temperature difference and can take place in any direction.

Keywords: Energy efficiency, buildings installations, financial investments

Contribution of Smart Control to Increasing the Energy Efficiency of Buildings

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ABSTRACT

In this paper, the authors propose and analyze some solutions for increasing the energy performance of buildings based on the introduction of smart control. Several categories of installations are of interest such as: air conditioning, heating, lighting, electricity or water supply. The energy performances of all the analyzed installations are added up and at the end the energy savings obtained on a technical basis are highlighted with the generated financial implications.

The work is structured in four parts. In the introductory part, are presented the importance of the theme and research trends in the field. The second part presents the characteristics of smart buildings and explains how to control them. In the third part of the paper, are described the categories of installations that can be intelligently coordinated to contribute especially to the increase of the energy performance of buildings. In the fourth part, ways and schemes of interconnecting the installations in the buildings are presented so that the introduction of intelligent control can be carried out on the building ensemble. At the end of the paper, are presented the conclusions of the authors that could be formulated regarding the topic addressed.

Smart buildings require connectivity between all their equipment and systems so that control is total and they can be optimally coordinated. An example is even the optimization of the cooling installation in summer time, which increases the efficiency of the cooling operation by incorporating weather data. Another example is using data from a security system to turn off lights and reduce cooling when no one is inside the building. Significant energy savings can thus be found. The result of communication between equipment and subsystems is a building where lighting, security, and heating-cooling installations allow data to flow freely back and forth, resulting in greater efficiency, greater safety and comfort, and lower utility costs.

Keywords: Energy performance, smart buildings, efficiency.

Electromagnetic Field Levels Analysis For Grid Connected Smart Devices

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ABSTRACT

All over the world, there is a revolution in power transmission and distribution driven by environmental and economic concerns. This revolution is led by the development of the smart grid. The smart grid is bringing radical change to both power systems and many related industries. This article reviews the development of the smart grid and its relationship to magnetics, including the electromagnetic compatibility issue, magnetic field-based measurement/monitoring, and magnetic energy storage/conversion. The difficulty of the magnetic field and the use of the latest magnetic technology in the development of the smart grid are discussed. In most cases, electromagnetic pollution emitted from smart electronic devices is much stronger than any natural electromagnetic field or radiation source. Wireless and radio communication, power transmission or devices in daily use such as smart phones, portable computers in tablets expose people to electromagnetic pollution every day. In this study, the technologies used in smart grids were examined in order to comply with the standards given in the World Health Organization reports, and the solutions of electromagnetic pollution caused by the electromagnetic fields produced by these technologies and the resulting electromagnetic radiation were focused on. Electromagnetic sources were simulated in the Magnet program and the results were interpreted.

Numerical Study of Combined Effects of Radiative Nanofluid and Fins Arragements Cases on Heat Sink Efficiency

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ABSTRACT

The purpose of this paper is to discuss numerically the efficiency of employing MHD radiative nanofluid within inclined heat dissipator box fitted with wavy fins with various arrangement cases. The study is established using the Comsol Multiphysics software. The effects of Rayleigh number ($10^3 \leq$Ra$\leq 10^6$), Hartmann number (0$\leq$Ha $\leq$30), the radiation parameter (0$\leq R_d \leq$2), the heat dissipator box inclination ($0^\circ \leq \gamma \leq 90^\circ$) and the wavy fins dispositions on the heat sink efficiency are studied. The data obtained shows that increasing Rayleigh number and the radiation parameter support the convection cooling efficiency, by constrast, the presence of Lorentz forces reduce it. In addition, relying on the dissipator box inclination, various scenarios are obtained related on the best wavy fins dispositions.

Keywords: Heat sink; Free convection; Thermal radiation; MHD; Nanofluid; Wavy fins dispositions.

A new design of a hybrid system for solar-powered water desalination

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ABSTRACT

The main objective of this work is to introduce a new design of a hybrid system for solar-powered water desalination. The main idea is to use different hybrid systems that operate in different operating temperature ranges. The low-temperature solar desalination system will use the residual thermal energy from the higher temperature system.

In addition, new and more efficient techniques will be invented to enhance the performance of solar distillers. Gaps in the knowledge of existing solar distillers will be investigated and filled using nano-polymer materials.

The resolution will be done using a mathematical model will be developed for the proposed configuration. Then, an energy balance will be established and the resolution will be done using CFD software. It is simulated using the commercial software COMSOL Multiphysics with MATLAB. We conclude an increase in performance with this new design of a hybrid system of water desalination using solar energy.

Keywords: Water desalination, Hybrid system, Solar energy, nano-polymer materials, COMSOL Multiphysics

Three- Dimensional heat transfer study of Shell and Tube Heat Exchanger

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ABSTRACT

The purpose of this paper is to perform and increase the efficiency of the Shell and Tube Heat Exchanger. For this, we simulate this exchanger type using the commercial software Comsol Multiphysics 5.6. After the validation of our model with the experimental results, we study the effect of some parameters on heat transfer rate by using the shell and tube type of heat exchangers. The influence of the number of tubes was investigated. Further, the effect of the number of baffles and spacing were studied. Then, the action of tube form and diameter were also explored. We conclude that the increase in tube numbers records an increase in the heat transfer rate of the studied heat exchanger. In addition, the partially increasing of the tube radius maintains too an increase in the heat exchanger. Also, the change set in the form of tubes to different ellipses affects the heat exchange within the heat exchanger. The most heat transfer rate was reached at the ellipse with radius one equal to 0.0045357 and radius two equal to 0.0041413. Further, baffle spacing, as well as baffle number, affect sincerely the value of the heat transfer rate. So, it is found that the most important rate is seen with 11 baffles with the littlest spacing suggested which is 0.021333 m. Finally, we choose the optimal parameters to make an ideal arrangement of the shell and tube heat exchanger to assimilate the maximum value of the transfer rate.

Keywords: Shell and Tube Heat Exchanger, Transfer rate, tube diameter, baffles, baffle spacing, Comsol Multiphysics.

Waste Estimation for Breeder Type Molten Salt Reactors

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ABSTRACT

The majority of commercial reactors rely on the fission of uranium (mainly uranium-235). The process of fission produces radioactive byproducts because of the ratio of protons to neutrons that is out of equilibrium. Over time, radioactive isotopes decay and become stable. However, it takes millennia for some radioisotopes to reach stability. The radioactive waste from those reactors is crucial for future generations as a result. Limiting waste is one benefit offered by Generation-IV reactors. Thorium breeder reactors were selected as one of the Gen-IV reactors. The mass number of thorium is 232. It transforms into thorium-233, which has a half-life of 22 min, after absorbing one neutron. Additionally radioactive, prototactinium-233 breaks down into uranium-233 which is not naturally occurring. However, it has good fissioning characteristics. Even though there are only two neutrons separating uranium-233 from uranium-235, the waste produced by uranium-233 fission has a substantially shorter half-life. Therefore, the reactor can breed its own fuel and produce less waste if thorium is added to the fuel along with fissioning isotopes. In the reactor, uranium and thorium can be combined as a molten salt. It is simple to remove useful isotopes from the molten fuel salt and use them as fresh fuel in the reactor. Since the molten salt reactors have not yet been made commercially available, there are no experimental results. The waste concentrations and amount can be estimated using Monte Carlo simulations. Nuclear engineers frequently employ Monte Carlo methods to solve the neutron transport equation. Since the 1940s, a number of codes have been created and tested for Monte Carlo calculations. One of the codes created by Oak Ridge National Lab in the US is SCLAE. The EVOL design was chosen as the reference model in Monte Carlo simulations since it is the design that comes closest to commercial-scale energy generation. It was discovered that the average half-life of waste from molten salt reactors was shorter than that of waste from conventional reactor types. Additionally, minor actinides from the fission process with qualities that favor neutron multiplication can be fed to the fresh fuel salt to increase the number of neutrons in the fuel. However, this necessitates the use of uncertainty analysis in future research on neutronics as well as chemical behavior.

Keywords: Molten Salt Reactors, SCALE, Monte Carlo, Nuclear Waste

Statistical Analysis for The Study Of The Reliability Of A Differential Filter

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ABSTRACT

We present from this work the results obtained from an in-depth analysis and an experimental study, on a very influential phenomenon affecting the majority of hydraulic systems and in particular the hydraulic filters which clean the hydraulic oil by retaining contaminants which can damage machine components.

Hydraulic oils are used in various industrial equipments (motors, machine tools, pumps, etc.). The main purpose of hydraulic fluid is to transfer the energy needed to operate machinery. The system studied, located in a workshop, is designed with a medium pressure pump used to supply energy to a rotating machine. Therefore we have analyzed the power of conservation of the particles of the filter, namely that the mesh of the filtering part is 15 micrometers in diameter. The influence of the service time and consequently the ratio of the number of polluting particles retained by the filter on the singular pressure loss of the element have been characterized.

The statistical study clearly reveals that the pressure losses at the level of the filter increase following a beta law. Obtaining this result, which gives us the evolution of the pressure drop phenomenon according to this law, will be useful to us for the proposal of a rigorous preventive maintenance policy.

Key words: hydraulic oil; filter, pressure, pressure loss, distribution law, pump.

Yer Altı Enerji Hatlarında Güzergah Tespit Cihazlarının Güncel Durumu Ve Geleceği

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ÖZET

Elektrik, telekomünikasyon ve görüntü sistemlerinde enerjinin ve verilerin iletilmesinde kablo sistemleri yoğun olarak kullanılmaktadır. Kabloların güvenlik ve çevresel kirlilik gibi sorunlara neden olmaması için yer altına yerleştirilmesi gerekmektedir.

Yer altında yapılacak altyapı ve inşaat projeleri gibi uygulamalarda kazı yapılacak alanda bulunan hatların bilinmesi iş güvenliği ve maliyet açısından çok önemlidir. Yerleşim yerlerinin yoğun olduğu bölgelerde, havai hatlardan yeraltı hatlarına geçiş yapılması için çalışmaların artırılması yeraltında kablo tespiti yapacak cihazlara ihtiyaç olduğunu göstermektedir. Yer altı kabloları dış etkenler sebebiyle arızalara açıktır. Yer altı kablolarında ezilme, eskime, dış darbeler, imalat hataları, ek yeri arızası, nem gibi birçok sebepten kaynaklı arızalar zaman içerinde oluşabilmektedir. Oluşan arızalar, elektrik enerjisinin bozulmasına veya uzun süreli kesintilere, özellikle de sanayi bölgesindeki tüketicilerde büyük zararlara sebep olmaktadır. Bu arızaların giderilmesi için yapılan kazı çalışmalarında, arızalı kablonun çıkarılması işleminin en kısa sürede yapılması dağıtım şirketleri ve onların hizmet verdiği özellikle fabrikalar gibi iş merkezleri için oldukça önemlidir.

Arızalı kabloların derinlik tespitinin klasik kazı yöntemi ile yapılması uzun süren ve maliyetli bir iştir. Sistem restorasyonunu hızlı bir şekilde takip etmek, kesinti süresini en aza indirmek ve parasal kayıpları daha da azaltmak için hızlı ve doğru bir arıza tespit tekniğine ihtiyaç vardır. Kablo hatalarını ayırt etmek ve bulmak için kullanılan geleneksel stratejilerin zaman alıcı olduğu görülmüştür.

Arızalı kablonun arıza noktası tespiti yapmak için TDR gibi yöntemler kullanılırken, kablonun yer altındaki konumu manyetik kablo bulucular ile yapılmaktadır. İthal ürün olarak temin edilip dağıtım firmalarında kullanılan kablo bulucular, yüksek maliyetleri, tek bobinli yapılarından dolayı derinlik tespiti hataları ve bulunan kablonun, kablo haritasının hassas bir konumlandırma ile CBS' ye entegre edilememeleri gibi dezavantajlara sahiptir.

Bu çalışmada elektromanyetik indüksiyon prensibi başta olmak üzere çeşitli yeraltı kablolarında arıza yeri ile ilgi teknikler araştırılmış olup yer altı enerji hatlarında güzergah tespit cihazlarının güncel durumu ve geleceği hakkında bir literatür araştırması yapılmıştır.

***Anahtar Kelimeler:** Yer Altı Kablo Tespiti, Kazı Çalışmaları, Arıza ve Bakım Çalışması Güvenliği, GNSS RTK, CBS*

ABSTRACT

Cable systems are used extensively in the transmission of energy and data in electricity, telecommunication and display systems. Cables should be placed underground in order not to cause problems such as safety and environmental pollution.

Knowing the lines in the area to be excavated is very important in terms of work safety and cost in applications such as infrastructure and construction projects to be made underground. Increasing the number of studies for transitioning from overhead lines to underground lines in densely populated areas shows that there is a need for devices to detect underground cables. Underground cables are prone to malfunctions due to external factors. Failures in underground cables can occur over time due to many reasons such as crushing, aging, external impacts, manufacturing errors, joint failure, moisture. The resulting malfunctions cause long-term interruptions, especially in the industrial area, causing great damage to consumers. It is very important to remove the defective cable as soon as possible in excavation works for distribution companies.

Depth detection of defective cables with the classical excavation method is a long and costly task. While methods such as TDR are used to detect the fault point of the defective cable, the underground location of the cable is made with magnetic cable finders. Cable finders, which are supplied as imported products and used in distribution companies, have disadvantages such as high costs, inability to integrate the cable map of the found cable into the GIS with a precise positioning.

In this study, techniques related to fault location in various underground cables, especially the electromagnetic induction principle, were investigated and a literature search was conducted on the current status and future of route detection devices in underground power lines

Keywords: Underground Cable Detection, Excavation Studies, Failure and Maintenance Operation Safety, GNSS RTK, CBS

Birincil enerji tüketimi: Ülkeler arası trend analizi

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ÖZET

Enerji tüketimi bir ülkenin ekonomik faaliyetlerinin en büyük belirtecidir. Ülkelerin ekonomik faaliyetlerinin zamansal değişiminin bir göstergesi olarak birincil enerji tüketimindeki değişimler analiz edilebilmektedir. Bu çalışmada Türkiye, İtalya, ABD, Brezilya, Mısır, Suudi Arabistan, Çin ve Güney Kore ile Dünya'nın toplam birincil enerji tüketiminin istatistiki analizleri yapılmıştır. Analizi yapılacak ülkelerin seçiminde gelişmişlik düzeyleri ve ülkelerin konumları dikkate alınmış, çeşitlilik sağlayabilecek ve karşılaştırılabilir ülkeler seçilmiştir. Birincil enerji tüketim verilerinin 1966-2021 yılları arasındaki uzun vadeli değişim trendleri ampirik olarak Yenilikçi Trend Analizi (ITA), Mann Kendall (MK) ve Sen'in eğim tahmin testleri kullanarak analiz edilmiştir. Bu amaç doğrultusunda; ülkelerin toplam birincil enerji tüketimine ait yıllık verileri kullanılmıştır. Analiz sonuçları ile oluşturulan grafikler birlikte incelendiğinde birincil enerji tüketimi için çalışılan tüm ülkelerde ve Dünya'da istatistiki olarak anlamlı düzeyde ve artan yönlü bir trend olduğu gözlemlenmiş ($p<0.05$) ve bu sonuçlar Yenilikçi Trend Analizi test sonuçları tarafından da desteklenmiştir. Ayrıca ITA ve Sen'in eğim tahmin testilerinin eğim değerleri arasında kuvvetli bir ilişki ($r^2=0.998$) bulunmuştur. Sonuç olarak nüfus, sanayi ve insanların refahındaki artışı ile teknolojik gelişmeler neticesinde ülkelerin birincil enerji kullanımının gün geçtikçe artacağı öngörülmektedir.

Keywords— enerji tüketimi, trend analizi, ülke

Primary energy consumption: Cross-country trend analysis

ABSTRACT

Energy consumption is the most important indicator of a country's economic activities. The changes in primary energy consumption can be analysed as an indicator of the temporal variation of the economic activities of the countries. In this study, statistical analysis of Global primary energy consumption and the primary energy consumption of Turkey, Italy, USA, Brazil, Egypt, Saudi Arabia, China and South Korea were performed. In the selection of the countries to be analysed, the development level, geographical locations of the countries, diversity and comparability were considered. The long-term trends of change of primary energy consumption data between 1966-2021 were analysed empirically using Innovative Trend Analysis (ITA), Mann Kendall (MK) and Sen's slope prediction tests. The annual data of the total primary energy consumption of the countries were used in the analyses. Analysis results and graphics were examined and it has been determined that there is a statistically significant and increasing trend ($p<0.05$) for primary energy consumption in all countries and globally. The results obtained were also supported by the Innovative Trend Analysis results. In addition, a strong correlation ($r^2=0.998$) was found between slopes of ITA and Sen's slope estimator. As a result, because of the increase in population, industry and people's welfare and technological developments it is predicted that the primary energy consumption of countries will increase in future.

Keywords— country, energy consumption, trend analysis

Design and Fabrication of Wind Tree Turbine Blade

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ABSTRACT

As the world is going towards renewable energy sources for energy production, the production of electricity from wind energy has proven to be an efficient, competitive, and pollution-free source of electricity production. The requirement for energy increases day by day as the population increases. Wind power technology is the process that promotes the usage of wind generation for mechanical power and electricity. An efficient aero generator would only be able to convert a maximum of 60% of available energy into mechanical energy. If blades are well designed the efficiency will be 70% probably. The objective of this research is to design a blade that convert more than 60% of available energy into mechanical work. The design of turbine blades has a great impact on enhancing the production of electricity. Our design was found more convenient and affordable. Available features and materials used in the fabrication of blade make it cost-effective as well. This research work expresses the complete design of savory wind turbine blades. We design this for the generation of 25W electricity. We approximately achieved our targeted output of 21.6W which is nearly equal to the theoretical output (25.2W).

Keywords: Energy Generation, Renewable Energy, Vertical Axis Wind Turbine (VAWT), Wind Energy, Wind Tree Turbine

Clean Energy Generation from Pressure Retarded Osmosis with Osmotic Power

Ozmotik Güç ile Basınç Geciktirmeli Osmozdan Temiz Enerji Üretimi

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ABSTRACT

Global energy consumption is increasing every day. However, the reserves of fossil fuels are decreasing and restrictions are increasing due to the environmental problems they cause. The demand for renewable energy sources is increasing significantly around the world. As a completely renewable and sustainable energy source with low operating costs, osmotic energy has gained popularity as a new approach, especially in 10 years. Osmotic energy takes advantage of the free energy released when mixing water flows of different salinities separated by a semi-permeable membrane. Although many countries produce significant amounts of energy from renewable energy sources such as wind, solar etc. it is estimated that osmotic energy technologies can provide more than 10% of the world's current energy demand with its global potential of approximately 1700-2000 TWh/year. In this study, osmotic energy was introduced and operations of pilot plants around the world were examined.

Keywords— Osmotic energy, PRO, membrane, renewable energy

ÖZET

Küresel enerji tüketimi her geçen gün artmaktadır. Fakat fosil yakıtların rezervleri azalmakta ve ortaya çıkardıkları çevresel problemler nedeniyle kısıtlamalar artmaktadır. Dünya genelinde yenilenebilir enerji kaynaklarına olan talep ciddi şekilde artmaktadır. İşletme açısından neredeyse maliyetsiz, tamamen yenilenebilir ve sürdürülebilir bir enerji kaynağı olarak osmotik enerji yeni bir yaklaşım olarak özellikle 10 yılda popülerlik kazanmıştır. Osmotik enerjisi, yarı geçirgen bir membran ile ayrılmış farklı tuzluluklara sahip su akışlarının karıştırılması sırasında açığa çıkan serbest enerjiden yararlanmaktadır. Günümüzde birçok ülke rüzgar, güneş vd. yenilenebilir enerji kaynaklarından ciddi miktarlarda enerji üretmekte olsa da henüz emekleme aşamasında olan bu teknolojinin sahip olduğu yaklaşık 17000-2000 TWh/yıl küresel potansiyel ile dünyanın mevcut enerji ihtiyacının %10'undan fazlasını karşılayabileceği tahmin edilmektedir. Bu çalışmada osmotik enerji tanıtılmış ve dünya genelinde işleme alınan pilot tesislerin verileri incelenmiştir.

Anahtar kelimeler — Osmotik enerji, PRO, membran, yenilenebilir enerji

Optical properties, influence of the polarization and the temperature on heterojunction organic solar cell

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ABSTRACT

We investigate the dark current-voltage properties of P3HT: PCBM based solar cell at different temperatures. The experimental data were fitted using two methods: Analytical Lambert Method, and Two Regions Method. Several electrical parameters such as: ideality factor n, series resistance Rs and shunt resistance Rsh were determined. The ideality factor for this device is bigger than unity which is discussed in terms: (i) existence of trap levels due to impurities in the band gap and (ii) the presence of tunneling conduction. It is shown that the J-V curves are driven by different effects depending on voltage and temperature ranges. By fitting the temperature dependence of the equivalent circuit's, we extract many essential parameters such as: potential barrier (Φb), Poole Frenkel coefficient βp, mobility μ, and carrier concentration. It is shown that at low temperature the transport properties are governed by Schottky effect while at high temperature the Poole-Frenkel effect is prevailing.

Keywords: Organic solar cells, Hole transport, mechanism of charge transport, Pool effect, P3HT: PCBM, Dark I-V characteristics.

An Analysis of Synthesis Of Renewable Chemicals From Lignocelullosic Biomass

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ABSTRACT

The primary reliable and cost-effective energy source that now ensures the production of required product quality is fossil fuels. According to statistics from the last ten years, the transportation sector uses more than 25% of the global energy, primarily diesel and gasoline. Recent years have seen a rise in interest worldwide in the use of renewable resources to displace petroleum as the principal feedstock for liquid fuels, chemicals, and materials. The rising price of oil and the harm that petroleum causes to the environment, and the benefits of renewable resources, such as their quantity and sustainability, make it attractive. The potential for bio-based compounds made from renewable resources is examined in this article. Since they make up around 95% of the biomass produced each year, carbohydrates are the most widely used feedstock for both commodities and specialized chemicals. Direct extraction, chemical and biological conversion pathways, as well as a few recent technological developments are covered. Examples of specific bio-chemicals are given, along with their conversion processes from biomass, derivatives, and prospective applications.

Keywords: Renewable, Chemicals, Lignocellulosic and Biomass.

Clean energy – vital to halting climate change, ensuring energy security, and promoting sustainability

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ABSTRACT

With a growing population comes a greater demand for energy, and while 9 out of 10 people now have access to electricity, those in rural and semi-urban areas still do not. Extreme greenhouse gas emissions and water consumption caused by non-renewable energy sources have a negative impact on the planet. Sustainable development necessitates the use of renewable energy sources like solar, wind, and hydropower that are gentler on the planet. Because 60% of the world's energy comes from non-renewable sources, 3 billion people use biomass fuels like wood, coal, charcoal, and animal waste for cooking and heating, and 4 million people die each year from exposure to toxic air in their homes, it is imperative that we find ways to produce clean energy so that everyone can enjoy the basic human right to a healthy and safe environment. There is a widespread electricity shortage in South Asian and African countries, but renewable energy sources can reach even the smallest villages. Rural electrification made possible by clean energy helps ease the food security, water security, and poverty crises. Sustainable agricultural growth is possible with the help of clean energy, which also benefits people and the economy. Various countries use solar energy and solar pump irrigation systems to ensure the long-term availability of nutritious food. This highlights the importance of investing in the necessary infrastructure and upgrading technology to meet the growing demand for modern and sustainable energy services in developing nations, especially in the world's least developed, smallest, and most geographically isolated regions. We need to set up renewable energy hubs for various renewable resources like wind and solar if we want to decrease electricity subsidies. We can potentially affect waste management, employment, cost-effectiveness, and power consumption all by building a biomass centre. Biomass fuel is readily available, efficient, environmentally friendly, and burning clean. Wind energy is clean and renewable, but there are concerns about its unpredictability and the noise created by wind turbines. To boost energy production, environmental sustainability, and this disadvantage-free strategy, we must create small, lightweight wind turbines for urban and rural areas which will reduce poverty and generate economy for all .

Keywords: Energy, electricity, sustainable agricultural growth, energy hubs, clean energy, solar energy

Communication and Responsibility About Oil and Gas Using YouTube

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ABSTRACT

Online social networks have become essential channels in business strategies. Companies have incorporated new social media in their relations with the citizens. Companies increasingly communicate about Corporate Social Responsibility through interactive online media. Corporate Social Responsibility communication faces new challenges in these spaces of the Web 2.0, where companies can interact with users, generate a brand community, increase their visibility, and strengthen their position in the market. This research discusses the use of YouTube and the audiovisual contents in the channels of five international oil and gas companies (ExxonMobile, Chevron, Shell, British Petroleum Company, Total Energies). As method of research we have used the visual analysis of video materials. Our analysis shows that the companies use two main strategies in videos on their YouTube Channel: marketing and public relations. In addition, our analysis point out that there is a tendency to hybridise the two above-mentioned strategies. Also the results show that companies use these spaces as channels for business and advertising communication, but not so much for Corporate Social Responsibility communication, despite these social media offer many possibilities for interaction and dialogue with the public. In the conclusions we assess that, giving the existing energy (oil and gas) crisis it would be important that the international oil and gas companies to enter into a dialogue with the audience and to adapt to the requirements of Corporate Social Responsibility communication with their customers.

Keywords: International Companies, Corporate Social Responsibility, Energy, YouTube

Narratives Of The Energy Crisis In Romania

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ABSTRACT

Crisis communication situations needs to be effective, because inefficiency can in this case results in problems at the organizational level, problems that can lead to serious, irreversible effects. Crisis resolution techniques and implicitly crisis communication within the academic context basically represent the management of these crises. The management of crisis situations is outlined by a series of measures, prepared in advance, measures that can allow an organization or institution to control, coordinate any crisis, emergency situation arising due to a triggering effect and also to minimize the chances of devastating effects on the organization. Also, crisis management can be seen as a process that is based on strategic communication, the objective being the elimination of risks and the uncertainty of subsequent consequences. In the case of the current energy crisis, crisis communication is particularly important. The present paper will present the narrative analysis of the political communication related to the gas and fuel crisis in the spring and summer of 2022 in Romania. The chosen method is the narrative analysis of the communications of the Government of Romania, respectively of the Ministry of Energy, in the time period January - June 2022. The analysis indicated that the political discourse is not focused on solving future situations, but on solving current problematic cases. The conclusions of our analysis indicate that the current energy crisis is presented in a narrative way through a discourse centered mostly on the actors involved, a contextual framework being outlined more externally and internally very few possible ways of solving the crisis were provided.

Keywords: Crisis communication, Crisis management, Energy crisis, Romania

Electricity Generation Using A Centrifugal Pump With An Open Impeller As Turbine In Reverse Mode

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ABSTRACT

Some countries in Africa are still plagued with the problem of epileptic electricity power supply which has crippled small and medium size businesses. It has also made enjoying social life in towns and cities very difficult. Most industries, where found generate electricity by themselves, causing enormous economic challenges and setbacks for these countries. The rural villages are not spared from this malady, a situation where some are yet to be connected to the national grid. The aim of this work is to investigate the operational parameters of a centrifugal pump as a turbine using an open impeller type for the purpose of generating electrical power. One of the most essential parts of a centrifugal pump is the impeller. The simplest type of impellers is the open impeller. The pump performance is dependent on the design parameters of the pump. The open impeller at the same diameter is lighter than any of the other type of impellers. They operate at a higher efficiency because of their lighter weight. In the method, performance tests were carried out on the centrifugal pump using an open impeller. Investigations were done to test and measure for the power input, power output, flow rate, velocity head, efficiency and specific speed of the centrifugal pump. The characteristic test carried out on the centrifugal pump using an open impeller. The evaluated parameters measured through numerical simulation for the open impeller at a head of $13 \cdot 70\ m$ were speed $(1700\ rpm)$ flow rate ($13 \cdot 61\ m^3/s$), velocity ($6 \cdot 7\ m/s$), shaft work ($111 \cdot 38\ W$), power input ($4224 \cdot 58\ W$), and power output ($3447 \cdot 18\ W$) at the best efficiency point of 76%.

Keywords: Centrifugal Pump, Open Impeller, Electricity Generation, Pump as Turbine

Biogas product simulation using ADM1 and feasibility study of using biogas in a power generation unit with Aspen plus

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ABSTRACT

Anaerobic digestion could be a renewable energy that produces biogas from organic waste. the little compatibility of anaerobic digestion efficiency with simulation is because of the dearth of a basic model, occurs from the complexity of the processes that include thousands of reactions and many microorganisms promoting anaerobic reactions; Therefore, closing simulation using the biogas production process model to seek out out the foremost important factors involved in anaerobic digestion and selecting the foremost effective ones to extend the efficiency of the method, and methane production. the requirement of simulating anaerobic digestion becomes significant when it's difficult to form balanced conditions within the system and therefore the costs of conducting experimental and practical tests are very high and time-consuming. On the opposite hand, selecting thousands of microorganisms of various substrates and many biochemical reactions involved within the process is practically difficult and even impossible. during this research, the ADM1 model was used as a simulation model. The effect of pH changes on methane production rate and methane production processes were investigated. The aim of this research was to supply an integrated modelling platform during which an anaerobic digester might be linked to the opposite unit operations which serve it, both in maintaining the physical—chemical conditions within the digester and in transforming the digestion products to useful fuel and nutrient sources.

A simulation of Biogas Digestion process has been meted out through Aspen Plus. The anaerobic metabolism, its inhibitions and its parameters are studied. Then a model of digestion has been performed using the knowledge found in IWA Anaerobic Digestion Model No. 1 and Angelidaki et al. 1998 model of anaerobic digestion where Acidogenic, Acetogenic and Methanogenic step has been implemented following the reactions shown in both models, also amino-acid degradation reactions are implemented. The research developed an energy model which linked ADM1 to the mechanical processes for biogas upgrading, Combined Heat and Power (CHP) production. This integration of the method components allows accurate sizing of the CHP and direct heating units required for an anaerobic digestion plant designed for fuel grade methane production.