BOOK OF ABSTRACTS

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CLIMATE CHANGE AS AN ENGINEERING CHALLENGE

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BOOK OF ABSTRACTS

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PLENARY SESSION

CLIMATE CHANGE AND ENERGY EFFICIENT ENGINEERING IN EDUCATION

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Abstract:
In this paper, we present dynamics of the development of knowledge about climate change and energy efficiency, especially in engineering, as an answer to rising issues brought by climate change, in the way they have been treated in two published textbooks: "Climate change" for university education and "Energy efficiency" for higher education. Both textbooks are published by Academic Mind, Belgrade as pioneering higher education literature in the Serbian language in the relevant areas of expertise and we discuss their importance for third-level education in these fields in Serbia. We further outline the latest discoveries in the rapidly growing field of climate change.

Keywords: Education, Climate change, Energy efficiency, Textbooks

COUPLED ENERGY AND ENVIRONMENTAL TRANSITION – POSSIBILITIES AND CONSEQUENCES

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Abstract:
The concept of the coupled energy and environmental transition is presented and discussed. Two transition goals are considered: carbon-free electricity generation and sustainable development. Appropriate indicators are used to indicate the transition's development. The intermittent renewable energy sources are considered for increasing carbon-free electricity generation. Presented concept shows the relation between improvements in forestry and possible further use of coal for electricity generation with simultaneously fulfilled imposed limit of carbon dioxide emission. The relation is given in the analytical form. The aim is to contribute to the options for sustainable development of undeveloped and developing countries. The example of Serbia is also presented and discussed.

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Keywords: Energy transition, Environmental transition, Sustainable development

THE PAST, PRESENT AND FUTURE OF THE ELECTRIC VEHICLES

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Abstract:
Electric vehicles are developed in parallel in the 19th and early 20th centuries, however at the beginning of the 20th century, due to the energy density of the fuel stored in the vehicle, the competition was decided in favour of internal combustion engines. Currently, at the end of the 20th century, it seems - due to environmentalists - that the competition with lithium technology will be decided in favour of electric vehicles. But what will happen in the future, this is a big question, can they still increase the energy density? New competing solutions are emerging, one of which is very spectacular, the hydrogen technology.

Keywords: Electric vehicles, Energy, Lithium, Hydrogen

TRANSFORMATION OF ENGINEERING PROCESSES THROUGH AN ESG PERSPECTIVE

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Abstract:
This paper analyzes the transformation of engineering processes through the integration of Environmental, Social, and Governance (ESG) principles. The analysis focuses on three main elements—environmental transformation, social integration, and governance optimization—each supported by specific sub-elements such as resource efficiency, carbon reduction strategies, stakeholder engagement, and transparent reporting. The relation between these elements highlights the potential for engineering practices. The goal of these practices is to align with sustainability, social equity, and ethical governance objectives. Challenges such as regulatory inconsistencies, high implementation costs, and organizational resistance are addressed, alongside opportunities for innovation and growth through green financing, technological advancements, and collaborative efforts. The study proposes actionable strategies for ESG-focused policies, education programs, and incentivized practices. A theoretical model for transforming engineering processes through the ESG perspective is also presented. This research contributes to the growing body of knowledge on ESG integration, offering practical insights and a theoretical framework to guide future developments in engineering practices.

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Keywords: engineering processes, transformation, ESG

HISTORICAL AND FUTURE CLIMATE CHANGE OVER THE PANNONIAN BASIN: USE CASE OF COPERNICUS CLIMATE CHANGE SERVICES

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Abstract:
This paper analyzes climate change trends in the Pannonian Basin using EURO-CORDEX regional climate models and data from the Copernicus Climate Change Service. The analysis, based on the RCP4.5 scenario, highlights a significant warming trend over the 21st century, with a projected temperature rise of up to 2°C by 2100. Results show a marked reduction in the number of frost days and increased winter precipitation, which may affect agriculture, ecosystems, and hydrology. Conversely, summers are expected to become drier, raising the risk of droughts and heatwaves. These climatic shifts have serious implications for water resources, food production, and regional planning. The study underscores the need for integrated adaptation strategies and informed decision-making to mitigate adverse impacts. The use of the Copernicus Interactive Atlas and AI tools enables accessible and robust analysis of climate indicators crucial for local and regional stakeholders.

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Keywords: climate change, Pannonian Basis, EURO-CORDEX

PANEL #1

ADAPTATION TO CLIMATE CHANGE IN SERBIA CONSIDERING ITS LEGAL FRAMEWORK

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Abstract:
Facing with climate change consequences is not just a challenge for an individual, but also for every national economy and the planet at all. First devoted steps to cope with them has been undertaken at the end of 20th century. But, not in a full extent considering most responsible ones. When key climate indicators have worsened in first decade of 21st century more serious endeavours had to be taken.
As the human activity has been found as a main cause which initiated and accelerated climate change logical conclusion was that human should find the way out of it. After various documents on international and national levels have been signed some developed countries have undertaking huge efforts to mitigate climate risks. Serbia as a less developed country should find its own way how to face with climate challenges particularly because of its very unfavourable position among European countries relating to ND – GAIN index.

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Keywords: Climate change policy, Greenhouse gas (GHG), Mitigating climate risks, Renewable energy source (RES), ND-GAIN index

RENEWABLE ENERGY SOURCES IN THE ENERGY DEVELOPMENT STRATEGY OF THE REPUBLIC OF SERBIA UNTIL 2040 WITH PROJECTIONS UNTIL 2050

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Abstract:
The energy transition is a process that requires a comprehensive transformation, first of all, of the economy and society, which necessarily aims at achieving a very significant reduction of the negative anthropogenic impact, primarily of the energy sector, on nature, the living and working environment. Special attention is paid to the reduction of greenhouse gas emissions. The process of energy transition requires first of all the use of new technologies, procedures and materials, which rely on innovation, digitization, digital integration and smart management of energy processes using artificial intelligence. Investments of significant material resources, resources of another kind and a change of consciousness of all subjects in the energy sector, but also in society as a whole, are needed. New geopolitical circumstances in the first half of the 21st century indicate that, in addition to goals such as: energy transition and improvement of the state and system of environmental protection, improvement of energy security, achieving energy independence and economic sustainability, the most important goals of the energy policy of the Republic of Serbia remain.

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Keywords: Energy transition, innovation, digitization, digital integration

RADON LEVEL STUDIES AND CLIMATE CHANGE

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Abstract:
Radon is a radioactive gas, not detectable by human senses as it is without smell, taste and color. It can leave the ground and enter into dwellings, ocasionally also in larger concentrations when presenting real threat to human health as the lung cancer can be also one of the consequences of its regular breathing in. Regular radon level controls are important in both living and working environment. Some global radon level studies show that climate changes can negatively influence radon level in houses, leading to its increased values. We monitored for few years radon concentrations at Technical College of Applied Sciences in Zrenjanin and at Technical Faculty "Mihajlo Pupin" in Zrenjanin in order to control radon concentration level.

Keywords: Radon Measuremets, Climate Changes

THE ROLE OF NUCLEAR ENERGY IN REDUCING CARBON DIOXIDE EMISSIONS

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Abstract:
Nuclear energy plays an important role in reducing carbon dioxide (CO_2) emissions since it allows the production of large amounts of electricity without the direct combustion of fossil fuels. Unlike coal and gas-fired power plants, nuclear power plants do not emit CO_2 during the operation, making them a significant factor in the fight against climate change. Furthermore, unlike renewable sources that depend on weather conditions, nuclear energy provides a stable and reliable source of electricity generation. Although there are challenges, such as solutions for radioactive waste and high initial costs, advancements in technology, particularly the development of fourth-generation reactors and small modular reactors, could further enhance the sustainability of this energy source. In combination with renewable sources, nuclear energy can contribute to reducing global fossil fuel consumption and facilitate the transition to a low-carbon economy.

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Keywords: nuclear energy, CO_2 emissions, climate change, renewable sources, fourth generation reactors

THE IMPACT OF SULFUR DIOXIDE IN THE AIR ON CLIMATE CHANGE AND ITS MONITORING

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Abstract:
The paper describes the impact of sulfur dioxide on climate change and its monitoring. As a key air pollutant, sulfur dioxide is produced by burning fossil fuels rich in sulfur, leading to aerosols and acid rain. Aerosols reflect sunlight into space, temporarily cooling the atmosphere, while acid rain negatively affects vegetation, soil, and buildings. Monitoring sulfur dioxide concentration is crucial for timely recognition and response to air pollution. Various measurement methods enable continuous air quality monitoring, including monitoring stations, mobile devices, satellites, etc. In Serbia, the SEPA network of monitoring stations is crucial for data collection and the definition and implementation of measures to reduce sulfur dioxide emissions into the air. Emission reduction can be achieved by using low-sulfur fuels, desulfurizing fuels, applying filters, and transitioning to renewable energy sources. Effective measures to reduce sulfur dioxide emissions contribute to reducing the greenhouse effect and global warming.

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Keywords: Sulfur dioxide, Air pollution, Climate change, Aerosols, Acid rain, Air quality monitoring

CLIMATE CHANGE AND CITY WATERWORKS

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Abstract:
The scarcity of water and the population increase on the planet are global problems that will become more and more pronounced in the coming decades. Water is a necessary resource for life and is often taken for granted. At the local level, the city's waterworks supply the population with clean drinking water 24/7. Their complex value chain as well as problems existing in primary activities, require efficient and effective management. With climate changes, as well as trends in the consolidation of cities, the business of city waterworks is under increasing pressure. In this paper, we will deal with some aspects of climate change that affect the city's waterworks and make their operations even more difficult.

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Keywords: city waterworks, value chain, climate change, water scarcity

THE SIGNIFICANCE OF FOSTERING ECOLOGICAL AWARENESS AND EDUCATION ON CLIMATE CHANGE FROM AN EARLY AGE

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Abstract:
The development of environmental awareness from an early age is crucial for environmental protection and sustainable development. Environmental awareness includes knowledge about the limitations of natural resources, valuing ecological situations and adopting responsible behavior towards nature. Preschools play a significant role in the formation of environmental habits among children through educational and practical activities such as recycling and learning about environmental protection. The goal of the research conducted was to analyze the attitudes of educators about the importance of environmental protection in preschool education, the level of their education, as well as the application of good practices. The results show that educators are interested in environmental topics, but they lack mandatory and systematic education. Children have basic knowledge about environment, but there is a room for improvement. The paper concludes that it is necessary to increase the presence of environmental topics in educational programs, develop cooperation with environmental protection organizations and involve parents in the education process. This approach would enable the development of awareness and responsibility towards nature among children from the earliest age, thus ensuring a solid bases in fighting climate change consequences.

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Keywords: environmental awareness, children, education, climate change.

PANEL #2

WEATHER SATELLITE IMAGE ENHANCEMENT USING HOMOMORPHIC FILTERING

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Abstract:
This paper presents an enhancement method for weather satellite images using a homomorphic filtering procedure. Homomorphic filtering is a technique applied in the frequency domain that enhances images by compressing their intensity range and simultaneously improving their contrast. Prior to applying homomorphic filtering, a median filter is used to remove noise from the input image. The results demonstrate that the proposed procedure successfully improves the visibility of weather satellite images.

Keywords: Image processing, Homomorphic filtering, Median filtering, Image enhancement

ELECTROSTATIC TRANSDUCERS IN ACOUSTICALLY POLLUTED ENVIRONMENTS

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Abstract:
This paper presents a novel approach to refining the parameters of electro-acoustical transducers aimed at achieving the highest quality, most precise sound reproduction, with a primary focus on headphones. It outlines the motivations, objectives, and outcomes of research dedicated to creating a new type of electrostatic headphone system, usable in highly noise polluted environments for personal noise protection. Achieving accurate design for electro-acoustic transducers it is crucial to control the frequency, phase, and polar responses of the speaker or headphone systems. Most audio devices on the market tend to prioritize frequency response, with varying levels of success. The behavior of the newly developed headphone system is demonstrated through various measurement techniques and listening tests.

Keywords: Electro-acoustic sound reproduction, Active noise cancelling, DSP processing.

THE IMPACT OF PLASTIC RECYCLING ON CLIMATE CHANGE

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Abstract:
Mechanical plastic recycling is one of the methods of possible re-using plastic waste, which contributes to the reduction of greenhouse gas emissions, as well as to the reduction of climate change and global warming. Mechanical recycling can be performed on all types of thermoplastics, while in this paper will be analyzed the extrusion process of polypropylene waste. The paper will analyze the impact of mechanical recycling of black jumbo polypropylene bags on air pollution. There will be presented the results of total organic carbon emissions measurement during the process of extrusion of the mentioned material. The fumes from extrusion process are sent to an exhaust gas purification system consisting of a scrubber, air dryer, electrostatic filter and activated carbon filter. After the air purification system, the obtained measurement results are below the permitted limit values, which complies with the legal regulations in the field of environmental protection.

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Keywords: plastic, recycling, air quality, total organic carbon emissions

RECYCLING PET PACKAGING FOR THE PURPOSE OF SUSTAINABLE DEVELOPMENT AND ECOLOGY

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Abstract:
This work is a leap from theory to practice and vice versa. This topic of the paper is the analysis of the situation, as well as the increasingly intensive need for recycling PET-packaging, as waste generated after used. The work can also serve as a proposal and handling of the generated waste, due to the increasing use of PET-material for the purpose of packing, for various types of products. The mentioned topic deserves enough entrepreneurship, engeneering, management, education in the context of ecology, as well as the adoption of new legal acts.

Keywords: Engineering, Management, Education, PET packaging, Recycling, Ecology, Activities, New legal acts

DEVELOPMENT OF SUSTAINABLE WASTE MANAGEMENT SYSTEMS USING ADVANCED SENSOR TECHNOLOGIES

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Abstract:
The increasing volume of waste, particularly paper, plastics and metals, necessitates innovative technological solutions for efficient sorting and recycling. Conventional waste management systems rely on manual separation and inefficient processes, leading to resource loss and environmental pollution. This study explores the integration of advanced sensor technologies to enhance waste classification and optimize material recovery.
Optical sensors, spectrophotometry, and hyperspectral imaging enable precise material identification based on optical properties, improving sorting accuracy and reducing contamination. Inductive and electromagnetic sensors enhance metal detection, while ultrasonic sensors facilitate material classification by density and structure. The implementation of these sensor-based automation systems significantly increases recycling efficiency, reduces landfill dependency, and promotes resource circularity.
By leveraging advanced sensor technologies, this approach supports circular economy principles, minimizes environmental impact, and contributes to the development of smart and sustainable urban waste management systems.

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Keywords: Advanced sensor technologies, Automated waste sorting, Optical sensors, Recycling efficiency, Circular economy

THE IMPORTANCE OF SCADA SYSTEMS IN THE AUTOMOTIVE INDUSTRY FOR REDUCING THE IMPACT ON CLIMATE CHANGES

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Abstract:
The automotive industry plays key role in global gas emission, contributing to the greenhouse effect. This paper explores the importance of SCADA (Supervisory Control and Data Acquisition) in optimizing industrial processes within automotive manufacturing and engine management. By real-time monitoring, optimization, control of industrial processes and data collection, SCADA contribute to reduce energy consumption and emissions of harmful pollutants such as carbon dioxide and nitrogen oxides. This paper analyzes technical architecture, specific applications in diesel engine control, and environmental benefits that are supported by relevant case studies and empirical data. SCADA systems may offer considerable advantages, but there are also challenges such as cybersecurity vulnerabilities, integration complexity and implementation costs that are also discussed.

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Keywords: SCADA systems, automotive industry, climate change, industrial automation, emissions reduction

CHALLENGES AND OPPORTUNITIES OF REUSING NON-RECYCLABLE MATERIALS IN THE CONTEXT OF CLIMATE CHANGE MITIGATION

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Abstract:
This paper explores the potential application of innovative recycling technologies for non-recyclable composite and mixed plastics, offering a sustainable solution in the fight against climate change. An eco-column, made from recycled materials with both circular and square cross-sections, was developed, and its bending resistance was tested to evaluate its ability to replace traditional structures made from wood, concrete, metal, or other materials. By reducing waste, conserving natural resources, and lowering plastic production, this approach contributes to mitigating climate change.

Keywords: Innovative recycling technology, Non-recyclable materials, Eco-column, Bending testing

PANEL #3

IMPACTS OF CLIMATE INDUCED WATER SCARCITY ON HYDROPOWER SECTOR – CASE STUDY OF HPPS CRN DRIN, NORTH MACEDONIA

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Abstract:
Water scarcity escalating by long and frequent droughts is becoming a raising trend in many regions globally. Environmental, social and economy sectors have been jeopardized thereby, in their survival, operation and development.
Water resources sustainable planning and management in long term has to respond to new challenges, due to more intensive and uncertain climate change impacts, demographic trends and economy growth, resulting in more intensive water resources demand.
The water deficit jeopardizes the long term operation and production of energy, as one of the main pillars of development of society and economy.
The paper presents implementation of an integrated simulation hydro – climate - energy model in the course of the project ARSINOE (https://arsinoe-project.eu/), in the Case Study of Ohrid and Prespa Lakes, shared by three countries (North Macedonia, Albania and Greece), to provide an improved representation of integrated transboundary water management under climate change scenarios, with a specific focus on energy sector (hydro power generation), its exposure and climate adaptiveness..

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Keywords: Water scarcity; Energy sector, Climate resilience and adaptiveness

DETECTION OF MICROBEADS IN SELF-DEVELOPED IN VITRO BIOIMPEDANCE ASSAY - A PROOF OF PRINCIPLE STUDY

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Abstract:
Research on micro- and nanoplastics is attracting greater interest. As current studies have shown, their presence is in environmental elements and living organisms, thus investigating their toxicity is of crucial concern. In previous work, the authors have developed a unique bioimpedance spectrum (BIS) measurement technology to study the biological processes of cell cultures in vitro. Exploiting the electrical properties of the material composition of plastics, it seems trivial to investigate how the BIS technique can detect them. Therefore, BIS data of plastic beads of 6 µm diameter were recorded at different concentrations. The correlation between microbead concentration and BIS data is established. The proof-of-principle measurements are successful and the technology is ready for testing with live cells.

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Keywords: Microplastics, In vitro assay, Bioimpedance spectrum, Sensitivity, Correlation

CLIMATE CHANGE MITIGATION OF THE OHRID - PRESPA REGION BY A STAKEHOLDER ENGAGEMENT

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Abstract:
Climate change, economic growth, and demographic shifts create complex, long-term challenges, particularly for water-dependent sectors such as agriculture, energy, tourism, and environmental systems. Traditional, isolated management approaches are increasingly ineffective, especially in transboundary regions where shared water resources face mounting pressures. Addressing these challenges requires innovative, multidisciplinary solutions that engage stakeholders and decision-makers across all affected sectors.
The H2020 ARSINOE project is tackling these issues in the transboundary Ohrid and Prespa Lakes region, shared by North Macedonia, Albania, and Greece. By applying System Innovation and Frame Design Thinking methodologies, the project fosters collaboration through national working groups and transboundary living labs. These participatory tools enhance communication, facilitate problem identification, and drive solution development—integrating research, planning, and citizen innovation.
This approach supports sustainable, climate-resilient water management by promoting cooperation among the three countries, ensuring continuous monitoring, and implementing adaptive strategies across sectors. Key outcomes include: improved understanding of lake interconnections, integrated data analysis (hydrology, economy, demography) and prioritization of water users and feasible climate resilience strategies.
The project delivers policy and management recommendations to ensure long-term sustainability—balancing water use with economic growth while protecting the environment. Given the region's UNESCO heritage and Biosphere Reserve status, ARSINOE aims to safeguard its ecological and cultural significance for future generations.

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Keywords: Climate resilience and adaptiveness, water scarcity, System Innovation Approach, Frame Design Innovation Thinking, stakeholder engagement, Ohrid and Prespa Lakes

CLIMATE CHANGE OBSERVATION WITH NOAA RECEIVING SYSTEM

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Abstract:
This paper presents the results of a university project focused on observing climate control changes through weather map images. The project aimed to design, commission, and automate a receiver system capable of receiving signals transmitted by meteorological satellites. Signal reception is achieved using a two-element crossed Yagi antenna paired with a preamplifier. The received signals, originally in audio form, are then converted into images using specialized software. A Hilbert transformation was employed to facilitate the conversion process. The results of the project demonstrate that the automated system operates flawlessly. Furthermore, the system is not only effective for meteorological signal reception but also suitable for receiving other FM-modulated signals. The system consistently produces high-quality meteorological images.

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Keywords: NOAA, FM modulation, APT system, image conversion

GREEN ENGINEERING AS AN ANSWER TO CLIMATE CHALLENGES

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Abstract:
Energy supply issue is no longer just about making more comfortable life of the mankind. Technologies that have been developed in the last two centuries slowly but surely led the life on the planet Earth to its limits. Global warming indicated even more than a century ago caused significant climate change that we are witnesses around the globe. Causes and consequences of these changes are well known today and new technologies desperately need to be developed in order to save our civilization on the planet Earth.
Technologies based on burning fossil fuels as energy source with no doubt should be replaced with other ones which are not harmful to the environment. These energy sources are most commonly named as “green” ones. Some of technologies that use green energy have been developed a century ago but only in new millenium their wider implementation, modernization and development of new ones become our new reality.

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Keywords: Climate change, green engineering, global warming, greenhouse gases (GHG), industrial revolution.

REPURPOSING WASTE FOR SUSTAINABLE ENERGY: A SOLAR COLLECTOR MADE FROM RECYCLED ALUMINUM CANS

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Abstract:
The increasing demand for sustainable energy solutions has driven the development of innovative methods for harnessing renewable energy. This paper presents the design, construction, and implementation of a cost-effective solar air collector made from recycled aluminum cans. By utilizing readily available, low-cost materials, this system offers an accessible and eco-friendly approach to improving energy efficiency. Its construction requires only basic tools and skills, making it feasible for individuals, households, and small communities to build and install their own solar collectors. This approach not only reduces waste by repurposing aluminum cans but also helps lower heating costs, particularly in colder climates. The system effectively raises air temperature, providing a practical solution for supplemental space heating. The primary goal of this paper is to demonstrate the potential of Do-it-yourself (DIY) solar collectors as an affordable, scalable technology for enhancing energy efficiency while promoting environmental sustainability.

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Keywords: Solar collector, Energy efficiency, Recycled aluminum cans

CLIMATE CHANGE AND BIOTECHNOLOGY: THE ROLE OF SUPERCRITICAL CO_2 EXTRACTION IN SUSTAINABLE BIOPROCESSING

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Abstract:
Supercritical fluid extraction (SFE) with CO_2 is an environmentally friendly biotechnology method that enables selective extraction of bioactive compounds without toxic solvents. This study investigates the application of SFE in obtaining bioactive compounds from lavender flowers and its advantages over conventional extraction methods. The results demonstrate that pressure and temperature optimization significantly impact extraction yield and compound composition. Additionally, SFE reduces energy consumption and chemical waste, making it a sustainable alternative for industries relying on plant-derived bio actives. The findings support the implementation of SFE in climate-conscious bioprocessing.

Keywords: Supercritical fluid extraction, CO_2 extraction,Biotechnology, Climate change, Sustainable processing

APPLICATION OF REFRIGERANT GASES AND THEIR IMPACT ON CLIMATE CHANGE

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Abstract:
Refrigerant gases are widely used today, from refrigeration devices for storage, air conditioning of facilities (from households to industrial facilities) to transport cooling and air conditioning in vehicles. Considering their widespread use, it is necessary to analyze their impact on climate change. Refrigerant gases, their application and impact on GWP (Global warming potential) and ODP (Ozone depletion potential) are presented in this paper. The paper shows the division of refrigerant gases according to their chemical composition and elements that affect the damage to the ozone layer and global warming with the greenhouse effect (GHG Greenhouse gases).

Keywords: Global warming potential, ozone depletion potential, refrigerant gases

THE INFLUENCE OF CLIMATE CHANGE CHALLENGES ON SUPPLY CHAIN FLEXIBILITY

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Abstract:
Climate change poses an increasing global risk to the sustainability and competitiveness of organizations, disrupting the stability of their supply chains. These changes, such as rising global temperatures, extreme weather events, and natural disasters, can significantly impact physical infrastructure, resource availability, and human mobility. Climate risks often have a cascading effect, impacting primary, secondary, and tertiary actors within supply chains. This paper explores the multidimensional impact of climate-related risks on supply chain stability, resilience, and performance. Additionally, it proposes strategies, technological, and organizational measures to mitigate these risks, thereby contributing to long-term sustainability and operational continuity.

Keywords: Climate Change, Supply Chain Management, Risk, Resilience, Sustainability, Supply Chain Disruption, Climate Risk Mitigation

IMPACT OF CLIMATE CHANGE ON QUALITY PARAMETERS OF DURUM WHEAT

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Abstract:
Durum wheat represents the most suitable raw material for the production of pasta. The high level of quality standard uniformity of different varieties of durum wheat is of great importance for pasta making industry. The genotypes quality is subject to changes to occur as a consequence of changed climate conditions. Genetic material used in this research includes fourteen genotypes of durum wheat grown on the same locality during two production years . The most important quality factors include a high content of protein, hectoliter mass, 1000 - grain weight, hardness, kernel vitreousness and sodium dodecyl sulphate sedimentation. The aim of this work is quality parameters assessment of various durum wheat genotypes grown during two productions years, examination of the relation between quality parameters, and of the climatic factors influence on the technological quality of durum wheat.

Keywords: Climatic change, Durum wheat, Technological quality Climatic

THE BENEFITS OF ARTIFICIAL INTELLIGENCE TO ADDRESS THE CHALLENGES OF CLIMATE CHANGE

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Abstract:
Climate change represents one of the serious challenges of modern times, with profound consequences for ecosystems, the economy and everyday life. In this context, Artificial Intelligence (AI) is increasingly recognized as a powerful tool used to recognize and manage complex climate processes. This paper explores concrete applications of AI in the fight against climate change, analyzing how these systems are used in energy, agriculture, risk management. Special attention is paid to ethical challenges such as bias, transparency and energy consumption, which accompany the application and development of AI technologies.

Keywords: Artificial Intelligence, Climate change, Energy efficiency, Sustainable development

TECHNICAL MEANS AND SYSTEMS FOR IRRIGATION IN AGRICULTURAL PRODUCTION

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Abstract:
One of the negative phenomena that occurs due to climate change on our planet is long-term dry periods in areas where there were none before. In order to eliminate the consequences as well as the need to improve the physical properties of the soil on which agricultural crops are grown, it is necessary to implement irrigation.
This paper specifies the technical means, methods and systems used in irrigation in the production processes of agricultural crops. From the classic means and systems, channels and irrigation systems, pumps, drip systems, typhoons, rain ramps and rain wings are selected and presented. Today, modern and achievements such as robots, drones and artificial rains are increasingly used.

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Keywords: climate change, irrigation, technical means, methods and systems

ENERGY EFFICIENCY AND ENERGY SECURITY IN THE INTEGRATED NATIONAL ENERGY AND CLIMATE PLAN OF THE REPUBLIC OF SERBIA FOR THE PERIOD UNTIL 2030 WITH A VISION UNTIL 2050

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Abstract:
The Law on Energy Efficiency and Rational Use of Energy is harmonized with the regulations in the field of energy efficiency in the EU, which was adopted with the aim of improving certain provisions of the existing Law on Efficient Use of Energy, the aforementioned legal document today represents a key framework for the field of energy efficiency, which determines the precise conditions and methods for the efficient use of energy and energy sources, the policy of efficient use of energy, energy management systems, measures of energy efficiency policy, energy use in buildings, energy activities and end customers, for energy facilities and energy services, energy labeling and requirements in terms of eco-design, financing, incentives and other measures in this area. Due to the need to implement a global framework that would contribute to avoiding dangerous climate changes by limiting global warming to a level well below 2°C, a multilateral process for implementing climate change measures was initiated. At the United Nations Conference on Climate Change (COP21), the Paris Agreement was adopted as the first universal legally binding international agreement on climate change.

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Keywords: Energy efficiency, energy security, energy and climate plan

CLIMATE CHANGE AND ENERGY POLICY AS AN IMPORTANT FACTOR IN THE HEALTH OF THE POPULATION

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Abstract:
Climate changes, continuously, more and more intensively and negatively, affect the health of the population. The growing impact on the environment and human health is becoming more extensive not only due to the immediate impact of climate change, but also due to various aspects of the implementation of energy policies. This process of energy production is directly related to the increasingly intense climate changes, and above all to rising temperatures and air pollution, caused by various factors. Mortality, as a consequence of the worsening of numerous chronic diseases, can be associated with long-term duration of elevated air temperatures, in summer periods, and increased air pollution due to the use of fossil fuels. For heating apartments and industry, during the winter months. The results of the HEAL survey indicate that air pollution in Serbia is a very serious problem, and that Serbia ranks second to last in terms of air quality in Europe. From that point of view, it necessary to change the energy policy (the disastrous impact of coal as a dominant energy source under the influence of pollution and climate change) and measures that have a very negative impact on the health of the entire population, but also on the sustainable development of the economy and society.

Keywords: climate change, renewable sources energy, economic costs, environmental protection;

PRODUCT LIFE CYCLE MANAGEMENT IN CLIMATE CHANGE

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Abstract:
Life cycle management of glass products is key to reducing the impact of increasingly pronounced climate change. The impact of glass materials on the environment through all stages of the life cycle of technological processes - from the extraction of raw materials (quartz sand, soda, limestone, and other additives), through production, transportation and use, to the end of life, and deposition as the final stage of the product life cycle. The emphasis is on examining the possibility of optimization through increased use of recycled glass, improving energy efficiency and reuse strategies. Life cycle assessment (LCA) enables the identification of critical points that contribute to environmental pollution through the emission of gases, with production and transport being recognized as the dominant sources of emissions. It points to major environmental issues as well as opportunities for improvement in product design decisions and material selection. The results indicate the importance of the circular economy in minimizing the ecological footprint, reusing - returning products to the life cycle, promoting sustainable solutions in production processes and managing products and processes in order to mitigate negative impacts on the climate and climate change.

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Keywords: Life cycle assessment (LCA), climate change, technological processes, glass product, life cycle stages

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