BOOK OF ABSTRACTS

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June 28 - July 2, 2020
Sarajevo, Bosnia & Herzegovina

4th SOUTH EAST EUROPEAN CONFERENCE ON SUSTAINABLE DEVELOPMENT OF ENERGY, WATER AND ENVIRONMENT SYSTEMS

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June 28 – July 2, 2020, Sarajevo, Bosnia and Herzegovina

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Conference Venue: Sarajevo

Sarajevo is the capital of Bosnia and Herzegovina and the country's administrative, economic, cultural, education and sport center. The City of Sarajevo is divided into four municipalities: Stari Grad, Centar, Novo Sarajevo, and Novi Grad.

Sarajevo surrounded by the Olympic mountains: Bjelasnica, Igman, Jahorina, and Trebevic. The average land elevation of the city is 500 m above sea level.

For several hundred years, the borders of two great empires, the Ottoman and Austro-Hungarian, which represented the two poles of the world at that time – East and West, Islamic and Christian – met in Bosnia and Herzegovina. This made the country and its capital a crossroads for different worlds – a place where the Orient met Occident in the heart of the Balkans. Sarajevo is one of those rare cities where, during a ten-minute walk, you can see places of worship for the world's most important monotheistic religions: Orthodox and Catholic churches, synagogues and mosques. All of these traditions have given Sarajevo a specific aroma and a particular cultural mix.

In Sarajevo, you can find traces of the Neolithic Butmir Culture, Illyrians, Romans, Slavs, as well as remains representing the medieval Bosnian Kingdom, the Ottoman and Austro-Hungarian Empires, the Kingdom of Yugoslavia and the Socialistic Federal Republic of Yugoslavia…. Over the past 100 years, Sarajevo has found itself a member of six different states and has witnessed the Sarajevo Assassination, the First and Second World Wars, the XIV Winter Olympic Games, the longest-running siege of any town in modern history…. Sarajevo is steeped in history and is always eager to share its many fascinating stories with visitors.

Scope and Objectives

The main challenge for South East Europe (SEE) economies is to commit to, and sustain the implementation of, long-term reforms aimed at increasing competitiveness and promoting sustainable, inclusive and balanced development, as well as better integration between the EU Member States, candidate and potential candidate countries and neighbouring countries. An adequate response to this challenge will certainly require using the best available scientific knowledge and constant re-evaluation of the development process in light of the scientific findings. Therefore, it will be essential to enhance the scientific understanding, improve the long-term scientific assessments, strengthen the scientific capacities and ensure that the sciences are responsive to the emerging needs.

> "History teaches us that men and nations behave wisely once they have exhausted all other alternatives"
>
> *Abba Eban*

Along this line, a regional series of biannual Sustainable Development of Energy Water and Environment Systems (SDEWES) conferences have been initiated to provide a venue for the researchers from the SEE region, but also for world-wide researchers and specialists and those interested in learning about the sustainability of development, to present research progress and to discuss the state of the art, the future directions and priorities in the various areas of sustainable development and regional integration.

The 4th SDEWES SEE Conference will be held in Sarajevo, Bosnia and Herzegovina, and will continue to successfully cover the following areas (examples in parentheses, but not confined to them), with particular focus on SEE region wherever possible:

- Sustainability comparisons and measurements (metrics and indices; multi-criteria analysis; external costs; exergy analysis; footprint methods; emergy; life cycle analysis)
- Green economy and better governance (circular economy; low carbon development/economy; resource efficiency; water reuse; jobs and regional development; macroeconomic analysis; financial and regulatory mechanisms; models and tools; rebound effect; energy economics; environmental economics; development economics; sustainability economics)
- Smart energy systems (markets; demand response; integration of power, heating/cooling, transport, water and waste sectors; smart grids; dynamic electricity pricing, microgrids)
- Energy policy (security of supply; climate change mitigation; energy transition; renewable energy support schemes; energy efficiency policy; employment creation; carbon pricing; markets; fossil fuel subsidies)
- Smart transport systems and policy (fuel/carbon economy; transport electrification; congestion and road pricing; multimodal management; alternative fuels; social aspects; autonomous mobility; railways; shipping; aviation)
- Water-energy nexus (water management; water system analysis; water pricing; water desalination; hydro energy; water-renewables integration, water resources; river basin management; arid areas)

> "You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete."
>
> *Buckminster Fuller, philosopher, futurist and global thinker (1895 - 1983)*

- Environmental policy and management (waste management; wastewater management; climate change mitigation; climate change adaptation; air pollution policy; water pollution policy; land management; biomass management; rewilding; social aspects; strategic environmental impact assessment, environment and corporate social responsibility, quality management systems; environment management systems; eco management and audit schemes; occupational health and safety assessment systems; hazard analysis and critical control point; integrated management systems)
- Agricultural policy (energy and water use in agriculture and food processing; food vs. biofuels; sustainability of biofuels production)
- Social acceptance (reform; NIMBY; nuclear; wind; biofuels; hydrogen; hidden and special interests; cost based pricing; inclusion; fossil fuel subsidy; green economy and employment; gender issues; energy poverty; energy affordability)
- Sustainable resilience of systems (resilience of energy systems; resilience of water systems; resilience of environmental systems; resilience of agricultural systems; resilience of social systems; resilience of engineering systems)
- Sustainable tourism (green hotels; certification)
- Urbanism (smart cities; urban planning; zoning; transport; zero energy buildings/districts; sustainable energy action plans; district heating/cooling)
- Regional planning and cooperation (sustainable islands; regions and cities; 100% renewable regions)
- Research, innovation and development (industry-academia partnership; quadruple helix; knowledge based society; knowledge management; learning curve; technology foresight; science diplomacy)
- Education in sustainable development (governance; environmental awareness; higher education; engineering education)
- Energy system analysis (energy planning; power system planning; smart energy systems; smart energy networks; natural gas system planning; 100% renewable energy systems; high penetration of renewables; island energy systems; development of energy planning tools; internalizing environmental externalities; electrification of transport; storage vs. grids vs. demand management; long term demand planning; integration of power and district heating systems; integration of power and water systems; integration of power and transport systems; power to gas)
- Transport management (transport system analysis, dynamic road pricing; electrification of transport)
- Renewable energy resources (biomass; hydro; wind; solar; geothermal; wave and ocean; technical and economic potentials; barriers; cost and benefits; integration)
- Primary energy resources (oil peaking; gas; coal peaking; nuclear fuels)
- Renewable electricity generation systems (biomass; hydro; wind; offshore wind; high altitude wind; photovoltaic; concentrated solar thermal power; geothermal; wave; tide; ocean thermal)
- Thermal power plants (clean coal; combined cycles; advanced cycles; flexible operation and cycling; carbon capture and storage/sequestration/reuse; nuclear)
- District heating and/or cooling in smart energy systems (integration of renewable heat; cogeneration; industrial waste/excess heat; waste to energy and CHP; power to heat; electric boilers; heat pumps; integration of CHP with district heating and electricity markets; heat maps; distribution)

- Nano and micro technologies and science for sustainable development of energy, water, and environment systems
- Advanced sustainable energy conversion systems (fuel cells; thermoelectric; thermionic; organic; ORC; waste/excess heat recycling; thermoacoustic; piezoelectric)
- Renewable heat systems (biomass; biofuels; biogas; solar; geothermal)
- Biofuels and biorefineries (biodiesel; bioethanol; biogas; second and third generation biofuels; waste to biofuels; algae; anaerobic digestion; BTL; biorefineries; alternative fuel vehicles; infrastructure; sustainability assessment; pyrolysis; torrefaction; coproduction)

"If there are to be problems, may they come during my life-time so that I can resolve them and give my children the chance of a good life."

Kenyan proverb

- Alternative fuels (hydrogen; electro-fuels; power to gas; synthetic fuels; BTL; DME; CNG; resources; production; vehicles; infrastructure)
- Hybrid and electric vehicles (first generation hybrid; plug in hybrid; charging; batteries; infrastructure)
- Water treatment for drinking water
- Water desalination (distillation; reverse and forward osmosis; electrodialysis; energy recovery; discharge management)
- Waste and wastewater treatment and reuse (avoiding waste; composting; recycling; waste to energy; anaerobic digestion; gasification; mechanical biological treatment; mechanical heat treatment; plasma arc waste disposal; pyrolysis; RDF/SRF; combustion modelling)
- Modelling for pollution avoidance and energy efficiency (CFD models; air pollution spreading; water pollution spreading; heat and mass transfer modelling combustion modelling)
- Cogeneration, trigeneration, polygeneration (heat/cold and power; water and power; biofuels and power; transport and energy; food and energy; applications and operation strategies)
- Storage (heat/cold storage; hydrogen storage; hydropower as storage; pump storage; compressed air storage; batteries; water storage; biofuels storage; storage optimisation modelling; financial support mechanisms; power market arbitrage)
- Electricity transmission and distribution (grid extension and robustness; long distance transmission; power quality)
- Gas security of supply (diversification; shale gas; extension of transmission pipelines; LNG; Southern Corridor)
- Energy and water efficiency in industry and mining (cement and lime; construction materials; glass; pulp and paper; food industry; metallurgy; chemical industry; process optimisation; kilns; boilers; heat exchange networks; pinch analysis; exergy and exergoeconomic analysis; energy audits; water use and waste minimisation; eco-innovation; total site integration; life cycle assessment; eco-design and eco-labelling; product cycle assessment; cleaner production, environmental impact assessment)
- Energy efficient appliances (smart appliances; labelling and standards; user behaviour)
- Buildings (nearly zero energy buildings; passive buildings; smart buildings; smart metering; ICT; load and demand side management; green buildings; building codes and standards; buildings certification; HVAC; insulation; renewables integration; heat pumps; storage; sustainable architecture)

- Energy markets (market/price coupling; liberalisation/deregulation; modelling; demand response; role of district heating; desalination and water pumping; storage; retail markets; grid parity; net metering)
- Emission markets (emission trading system; cap and trade; transport participation)
- Political aspects of sustainable development (long term planning; sustainable development goals; the role of political leaders and of voters; international conflict vs. sustainable development; security and sustainability; resource and political security)

"Then I say the Earth belongs to each generation during its course, fully and in its right no generation can contract debts greater than may be paid during the course of its existence"

Thomas Jefferson, September 6, 1789

In addition, acknowledging that regional coordination is the only feasible solution for gaining synergy effects for the small and only partially connected emerging energy markets of the Southeastern Europe, the Conference will address the core goals of the Energy Community and the wider region:

- Competitive integrated regional energy market (regional cooperation, market opening, price reform, regulatory framework and independence, coordination on regional projects, market coupling)
- Security of supply (diversification of fuels, energy efficiency, oil and gas storages, regional emergency response, energy and water scarcity)
- Climate change and environment (regional emissions reduction plans, fuel mix in power generation - renewable energy - gasification - energy efficiency, intelligent use of energy)
- Infrastructure development (Mediterranean power ring, Southern Corridor, investment projects of regional interest - minimum definition criteria, investments in the gas sector, electricity interconnections, grid access and integration of renewable energy)
- Social dimension (energy poverty, definition of vulnerable customers, protection schemes, stepwise phasing out of regulated energy prices, fossil fuel subsidies)
- External relations in light of sustainable development (enlargement - EU neighbours, cooperation with other international organizations)

Preface

The objective of the series of conferences on Sustainable Development of Energy, Water and Environment Systems (SDEWES) is to provide a forum for world-wide specialists and those interested in learning about the sustainability of development, to present research progress and to discuss the state of the art, the future directions and priorities in the various areas of sustainable development. This includes the improvement and dissemination of knowledge on methods, policies and technologies for increasing the sustainability of development, taking into account its economic, environmental and social pillars, as well as methods for assessing and measuring sustainability of development, regarding climate, energy, transport, agriculture, water and environment systems and their many combinations. The reason for the forum having such a wide scope is due to the need for holistic integrated solutions encompassing several or all.

Prof. Maria da Graça Carvalho

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National Energy and Climate Planning Approach for the Western Balkans: Case Study Republic of Serbia

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Abstract

Just in the immediate neighborhood of European Union (EU), Western Balkan (WB) countries are lagging behind in the energy transition regardless technological advances and policy instruments available. EU recently created a momentum for the energy transition acceleration with the European Green Deal, which is forwarded to the WB through the Energy Community secretariat and in general, the response in the form of National Energy and Climate Plans (NECPs) is expected in the short to midterm. Recently presented the new Republic of Serbia's Low Carbon Development Strategy with Action plan (LEDS) will be analyzed, commented and improvements suggested for the acceleration of the energy transition, based on the newest findings from the simulation-based optimization techniques using the sectors coupling approach. Furthermore, integrated assessment modeling (IAM) techniques, exploring the climate and energy cross impacts with the more details will be included. The purpose of the research is to provide the decision makers in the WB with the best available insights regarding sustainable energy systems, and citizens of the WB with better chance to benefit from adoption of these strategies in just transition.