

## From the Guest editors of Part one

### "SPACESHIP EARTH – WILL WE BE ABLE TO PREVAIL? QUESTION OF SUSTAINABILITY"

The words from the Adlai Stevenson's excellent speech to the UN [1] in which he said: *"We travel together, passengers on a little space ship, dependent on its vulnerable reserves of air and soil; all committed for our safety to its security and peace; preserved from annihilation only by the care, the work, and, I will say, the love we give our fragile craft. We cannot maintain it half fortunate, half miserable, half confident, half despairing, half slave-to the ancient enemies of man-half free in a liberation of resources undreamed of until this day. No craft, no crew can travel safely with such vast contradictions. On their resolution depends the survival of us all."* could not be more true than in this moment when the World is facing many critical political, economic and social problems. Population growth and increasing consumption connected with strong economic inequality (25% of the population of the world consumes 75% of its natural resources [2]) put pressures on limited natural resources: water, forests, fish stocks, minerals, land for food production and living space, etc. Questions of environment and energy are now top on our priority list.

The issue of non replenishable energy resources was also addressed by Buckminster Fuller, in his book [3]: *"...we can make all of humanity successful through science's world-engulfing industrial evolution provided that we are not so foolish as to continue to exhaust in a split second of astronomical history the orderly energy savings of billions of years' energy conservation aboard our Spaceship Earth. These energy savings have been put into our Spaceship's life-regeneration-guaranteeing bank account for use only in self-starter functions."*

We are witnessing, much earlier than we thought it was possible, changes in our near environment. Climate change, pollution, species extinction are some of the vivid indicators that we crossed the border of sustainability. More frequent severe weather conditions that could be attributed to climate change, which is itself often associated with anthropogenic influence [4], entered our everyday lives. The IPCC reported in its latest report [5] that we have already emitted more than half of our carbon budget, permitted if we do not want to exceed 2 degrees Celsius, widely considered as a threshold of serious harm. If we continue as hitherto we will emit the rest in less than 30 years.

Never before we have had to solve the problems on such a scale. Sustainable development offers a path we should take if we want to balance the need for development with the sustainable use of resources, and at the same time overcoming poverty and reducing pollution. A knowledge economy could both help to *"shorten the timetable for progress on sustainable development and also to offer a potential "win-win" alternative to the traditional trade-off between growth and environmental sustainability"* [6]. Innovative technologies (along with cleverer policies) will help to use the resources in a more efficient way, by integrating processes, incorporating renewable and alternative energy sources, and reusing waste materials.

The 8<sup>th</sup> Conference on Sustainable Development of Energy, Water and Environment Systems – SDEWES Conference, held in Dubrovnik in 2013, was dedicated to the improvement and dissemination of knowledge on methods, policies and technologies for increasing the

sustainability of development by de-coupling growth from natural resources and replacing them with knowledge based economy, taking into account its economic, environmental and social pillars, as well as methods for assessing and measuring sustainability of development, regarding energy, transport, water, environment and food production systems and their many combinations. Sustainability being also a perfect field for interdisciplinary and multi-cultural evaluation of complex system, the SDEWES Conference has at the beginning of the 21<sup>st</sup> century become a significant venue for researchers in those areas to meet, and originate, discuss, share, and disseminate new ideas.

The 8<sup>th</sup> SDEWES Conference was the most successful up to date, attracting authors from 63 countries with 554 presented papers at 62 regular sessions (including for the first time at this conference one online session), ten special sessions and five poster sessions, seven invited lectures and two panels.

This special issue of papers presented at the SDEWES Conference will try to help energy and environment researchers and experts in the region as well in the World to improve the insight into the problems and solution of the things to come.

A good way of decoupling growth from (often limited) resources is to decarbonize the economy. So Gvozdenac (in this issue, p. 683) explores suitable energy policy instruments for energy efficiency improvement in Serbia. Similarly Atis (in this issue, p. 695) analyses the Turkey's policies relating production of electricity in terms of sustainability. Mentis (in this issue, p. 709) seeks solution to decreasing reserves of lignite predominantly used in Greece for electricity production by replacing it with solar and wind resources. The similar problem of diminishing lignite resources presents a challenge for its neighbour, Macedonia, where Taseska-Gjorgievska (in this issue, p. 721) explores the impact of reduced hydro capacity and lignite resources on the Macedonian power sector development. Protic (in this issue, p. 731) researches how decentralized supply systems based on renewable energy sources can offer economically preferable option for power supply of small isolated rural regions of Croatia. Continuing with planning and modelling of energy systems, Bjelic (in this issue, p. 743) analyses integration of the flexibility of the average Serbian consumer as a virtual storage option into the planning of energy systems while Androcec (in this issue, p. 755) puts emphasis on impact of different cross-border electricity trading mechanisms in regional power market.

Hausl (in this issue, p. 771) investigates how the climate change affects regional energy systems in Austria, with a focus on space heating and cooling, but also if these effects will influence the potential of renewable energy sources. On the same track is next paper of Vucijak (in this issue, p. 787) which examines the effect of climate change on precipitation patterns in the selected B&H cities. A statistical analysis for hydrothermal scheduling is researched by Sutlovic (in this issue, p. 799).

Going back to innovative technologies, Barbazza (in this issue, p. 811) optimizes compact organic Rankine cycle units for domestic solar applications while Avsec (in this issue, p. 823) analyses thermochemical production of hydrogen in combination with nuclear power plant. Conversion of waste material into valuable products such as synthetic fuels is a broader topic of the paper of Apaydin-Varol (in this issue, p. 833) who studies the pyrolysis of polycarbonate waste.

Increasing the efficiency of conventional technologies, which still prevail today, is a subject of next group of papers. Thus Zivic (in this issue, p. 843) works on increasing the thermal and exergy efficiency of a Brayton cycle while Czarnowska (in this issue, p. 853) conducts thermo-ecological optimization of heat exchanger by applying combination of neural and CFD modelling. Du (in this issue, p. 863) saves on cooling water by examining performances of dif-

ferent kinds of heat exchangers for indirect air-cooling towers and Smajevic (in this issue, p. 875) investigates efficient and clean technologies of combustion of Bosnian coals in order to decrease their emissions.

Last group of papers considers the energy efficiency (and indoor comfort) in buildings and so Singh (in this issue, p. 889) establishes relation between indoor thermal environment and renovation in residential buildings in Liege, Belgium. Stefanovic (in this issue, p. 903) analyses indoor-outdoor pollution exposure, thermal and physical properties of the housing stock samples and occupant's behaviour in Serbian cities Belgrade and Nis while Tomic (in this issue, p. 915) seeks to improve indoor air quality in IT classrooms. Gupta (in this issue, p. 925) investigates thermal performance of static sunshade and brick cavity wall for energy efficient building envelope in composite climate of India. Lastly, Pavlic in his paper (in this issue, p. 935) examines the concept of green port on the case of Slovenian port of Koper by improvement of the overall energy efficiency, fuel switching, energy and environmental management practices, and reduction of emissions.

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## References

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