

Foreword

This International Conference of the Croatian Nuclear Society, subtitled “Nuclear Option for CO₂ Free Energy Generation”, is already a 13th event in the successful series of international conferences organized biennially by the Croatian Nuclear Society, which was formerly known under the subtitle “Nuclear Option in Countries with Small and Medium Electricity Grids”. This 13th event comes, after two postponements, as a first conference in the series since the outburst of the COVID pandemic. The numbers of participants and papers submitted clearly show that the interest in the subjects related to the nuclear option does not diminish.

The purpose of the conference series remains to be presenting and discussing the most relevant topics concerning the role and position of nuclear option in the current energy balance, with special attention paid to the countries with small or medium electricity grids. The conference series was initiated in 1996 with the first conference taking place in Opatija. It was followed by seven conferences in Dubrovnik and the last four which were held in Zadar. This 13th conference, the last one in the series for now, takes its place in Zadar again.

In the societal context which is considerably marked by dynamic economic growth and concerns which include energy resources and their stability, potential climate changes and increasing greenhouse gas emission the issue of ensuring reliable and sustainable energy is becoming ever more challenging. Nuclear energy, as the CO₂ free energy source, should have its place in resolving these concerns and enabling all the countries to cope with challenges under such context.

In view of good response and success of the previous conferences in the series, this 13th International Conference concentrates on these topics, as well as on those which attracted the most interest in previous conferences in the series. The Conference addresses the most relevant aspects of safety assessment of nuclear energy option. Additionally, it considers the nuclear option also from the point of view of the national energy strategies, resources, costs, technological, organizational and educational requirements, as well as environmental advantages. It, also, focuses on the matters related to the operation and design safety, fuel cycle, waste management, and decommissioning.

The important goal of the Conference, as in the previous cases, is to promote regional co-operation and exchange of experience in use of nuclear power and fuel cycle facilities among the countries with an interest in the nuclear option. The importance of international cooperation for the assessment of the nuclear option has been recognized by the International Atomic Energy Agency (IAEA). As a result of this recognition, the

Conference is organized in cooperation with the IAEA, European Nuclear Society, and University of Zagreb, Faculty of Electrical Engineering and Computing took considerable part in the preparation and organization of the Conference.

Topics which are addressed by different sessions at the Conference reflect the above mentioned aspects of safety assessment, facility operation and design, fuel cycle, energy strategies at national level, regulatory practices, radioactive waste management, decommissioning, as well as many others. The papers presented at different sessions promote international exchange of experience and co-operation among the interested parties in these fields.

Authors' and presenters' contributions are provided in 8 invited presentations and lectures and 66 contributed papers.

The invited presentations address as diverse subjects as applications of small modular reactors, need for enthusiastic young nuclear professionals in order to ensure the future of nuclear energy, role of nuclear option in achieving net zero, design and safety assessment and verification of different reactor technologies (including the advanced reactors), status of the new NPP project in Slovenia and developments in the field of accident tolerant fuel materials.

The contributed papers are grouped into eight thematic sessions:

S1: Nuclear Safety Analyses (NSA)

S2: Operation and Maintenance Experience (OME)

S3: Nuclear Energy: Planning, Environment and Technologies (NEPET)

S4: Regulatory Practice and Emergency Preparedness (RPEP)

S5: Reactor Physics and Nuclear Fuel Cycle (RPNFC)

S6: Severe Accident Analyses and Risk Assessment (SAA)

S7: Radioactive Waste Management and Decommissioning. Radiation Hazard and Protection. (RWMD)

S8: Safety Culture, Knowledge Management and Public Relations (SCPR)

As with the previous conference in the series, a topic of particular interest remains the role of Small Modular Reactor (SMR) designs in nuclear energy program and possibilities of inclusion of SMRs in the long term energy strategies. This topic is a subject of one among the invited presentations and is additionally addressed under the panel discussion, which is one of the focal points of the conference.

The main topics of the panel discussion were, for this conference, selected to be some basic preconditions needed for the nuclear option to become a relevant part of the solution of the global climate problems. For this purpose, the panel discussion is divided in two parts. The first part discussed the role and the importance of the nuclear option in

national energy strategies while the second part is devoted to the challenges of the public relations for the nuclear option.

This Conference Proceedings provides full reviewed text of contributed papers, full text or abstracts of invited presentations and summarized outlines and topics of the panel discussion.

We would like to express our gratitude to not much less than 200 authors and co-authors that put a large effort into completing their full camera-ready papers. We would also like to thank the sessions' coordinators and chairs, reviewers, and all those who gave a hand in organizing the Conference.

Special acknowledgments are given to the International Atomic Agency and the European Nuclear Society for their provisions.

Last but not least, we are particularly grateful to all the sponsors and donors whose help has been essential for the success of this International Conference. We express our thanks to all those who, through their efforts and participation, have contributed to the Conference's success.

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Editors