Foreword

Croatian Nuclear Society continues with its successful series of international conferences for professionals working in the field of nuclear energy and associated areas. This International Conference of the Croatian Nuclear Society, subtitled "Nuclear Option for Resilient Electricity Generation", was already a 14th event in the successful series of international conferences, formerly known as "Nuclear Option in Countries with Small and Medium Electricity Grids", biennially organized by the Croatian Nuclear Society.

The purpose of the conference series is to present and discuss 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 and medium electricity grids. Main concerns with which modern society is faced include availability of energy resources, greenhouse gas emissions and potential climate changes with evidence of apparent global warming. In such a context the issue of ensuring reliable and sustainable energy becomes ever more challenging.

Nuclear energy as the CO_2 free energy source should have its place in resolving these concerns and enabling all the countries to cope with facing challenges. The energy sector needs to be fundamentally transformed into a low carbon energy supply system to assure that world will be able to mitigate climate changes in the next decades. At the same time, the sector needs to withstand extreme events and to adapt to changes in the environment. Nuclear power's resilience follows general definition of resilience as the ability to limit the extent, severity, and duration of system degradation following an extreme natural or man-made event. The resilience is already closely integrated in concept of nuclear safety, making the nuclear power reliable energy source, and helping the global community to overcome potential challenges in near future.

Following the success of the previous conferences in the series, the 14th International Conference in Zadar accomplished the same general purpose, concentrating on the topics which attracted the most of interest previously.

At the Conference, the nuclear option was considered and discussed from the point of view of national energy strategies, resources, costs, and technological, organizational, and educational requirements, as well as environmental advantages. The focus was on matters related to nuclear power plants operation and design safety, fuel cycle, waste management, decommissioning and achievement of Long Term Operation (LTO). Successful LTO should be considered in the light of plant generation of reliable, safe, low-cost, low-emission electricity for decades longer than originally envisioned. As in the previous cases, the important goal of the Conference was 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.

Authors' and presenters' contributions are provided in 9 invited presentations and lectures and about 50 contributed papers. The contributed papers are grouped into eight thematic sessions:

S1: Nuclear Safety Analyses (NSA)
S2: Operation, Maintenance and Lifetime Expansion Experience (OMLEE)
S3: Nuclear Option in the Context of Energy, Economics, Finance and Resilience (NEEFR)
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)

The topic of particular interest to this conference was nuclear energy in climate resilient, low carbon energy systems, which was a subject of one among the invited presentations and was additionally addressed under the panel discussion, which was one of the focal points of the conference. This topic has put forward the nuclear option as an important and integral part for global climate change mitigation.

This Conference Proceedings provides contributed full papers, after the successful finalization of the review process, invited presentations and summarized outlines and topics of the panel discussion. The Proceedings with full papers in the pdf format are provided for download from the Conferences website which can be accessed at: https://nuclear-option.org/proceedings/

We would like to express our gratitude to all 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 this 2024 Conference in a series.

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Finally, 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