Jožef Stefan
Institute

R4

Reactor
Engineering
Division

Nuclear Slovenia

and the roles of the Jožef Stefan Institute

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President, European Nuclear Society

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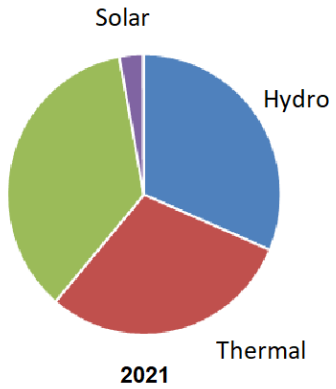
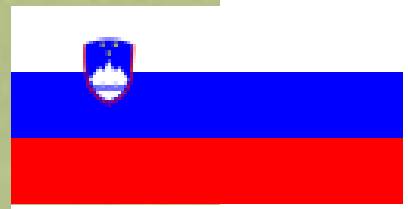
Jožef Stefan Institute R4 Reactor Engineering Division

Nuclear Slovenia

Electricity consumption (13.6TWh)





Slovenia:
Population ~2,108,732 (2022.7)
GDP PPP 30,860 $ (2023)
Area 20,271 km²

Nuclear Slovenia

- ½ nuclear power plant (350 MWe, 3 TWh/y)
- 1 research reactor (250kW TRIGA Mark II)
- 1 decommissioned and closed uranium mine
- 1 intermediate LIL waste repository
- 1 location for final LIL waste repository
- 1 graduate school of nuclear engineering
- 1 nuclear training centre
- 2 regulatory bodies -nuclear & radiation safety
- 17 technical support organizations (to the regulator)

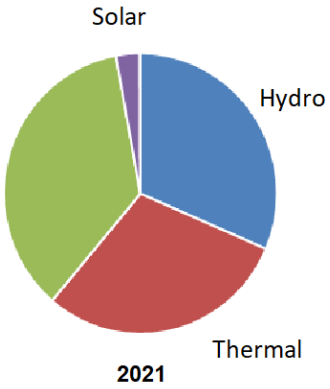
Nuclear Jožef Stefan Institute

- ½ nuclear power plant (350 MWe, 3 TWh/y)
- 1 research reactor (250kW TRIGA Mark II)
- 1 decommissioned and closed uranium mine
- 1 intermediate LIL waste repository (operated by ARAO)
- 1 location for final LIL waste repository
- 1 graduate school of nuclear engineering (with Uni Ljubljana)
- 1 nuclear training centre (with Gen Energija)
- 2 regulatory bodies -nuclear & radiation safety
- 1 of 17 technical support organizations (to the regulator)

Krško NPP

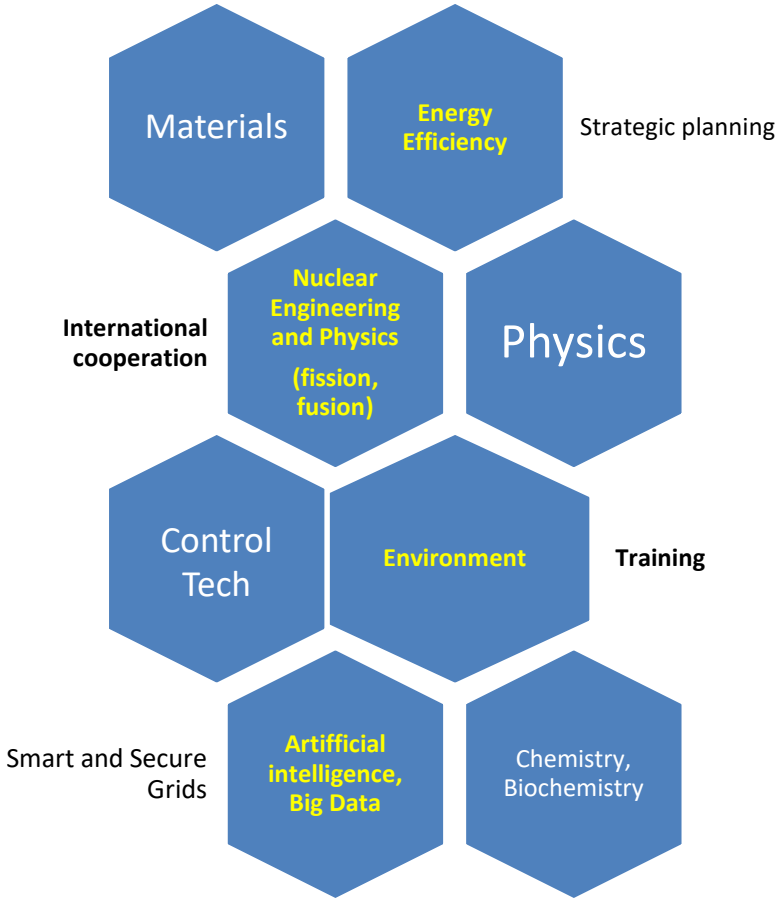
- Westinghouse PWR
- 2 loop: 700 MW(e)
- Commercial operation 1983-2043 (10 y PSR!)
- Ownership 50:50 Slovenia-Croatia

Electricity consumption (13.6TWh)



5-6 TWh/year
50%➔ .SI
50%➔ .HR

Jožef Stefan Institute and energy research (since 1949)



Ideal for energy research:

- Developed through **bottom-up actions (curiosity)**
- Staff of ~1200
- Internationally renowned

Strengthening through Top-Down:

- Strategic guidance and long-term financing (.gov and .com) needed

Roles of the Jožef Stefan Institute

Research on nuclear technologies and safety

- Reactor Physics F8 (fission, fusion)
- Reactor Engineering R4 (fission, fusion)
- TRIGA research reactor
- Low and Medium Energy Physics F2 (fusion, radiation protection)
- Surface Engineering and Optoelectronics F4 (fusion)
- Nanostructured Materials K7 (fusion)
- Environmental Sciences O2 (radio chemistry, radiation protection)

SNETP Sustainable Nuclear Energy Technology Platform

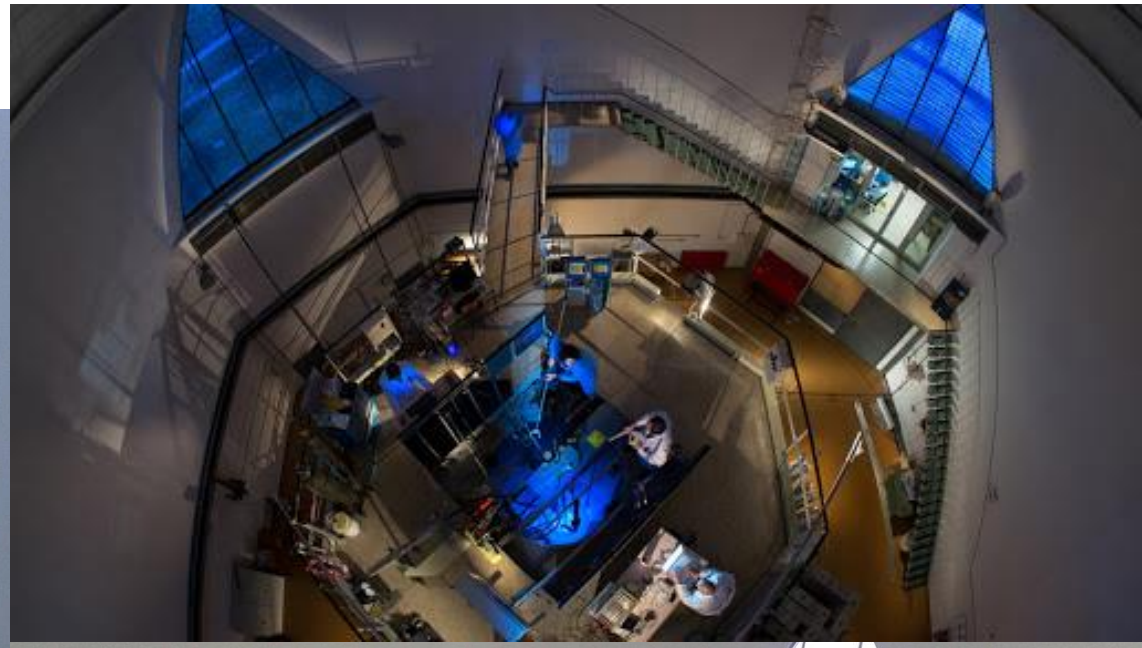
EUROfusion

EUROPEAN JOINT PROGRAMME FOR THE INTEGRATION OF RADIATION PROTECTION RESEARCH CONCERT

Nuclear fission: the main focus in the past.
With time, focus was shifting from nuclear (curiosity).

Jožef Stefan Institute R4 Reactor Engineering Division

TRIGA Mark II @ Jožef Stefan Institute



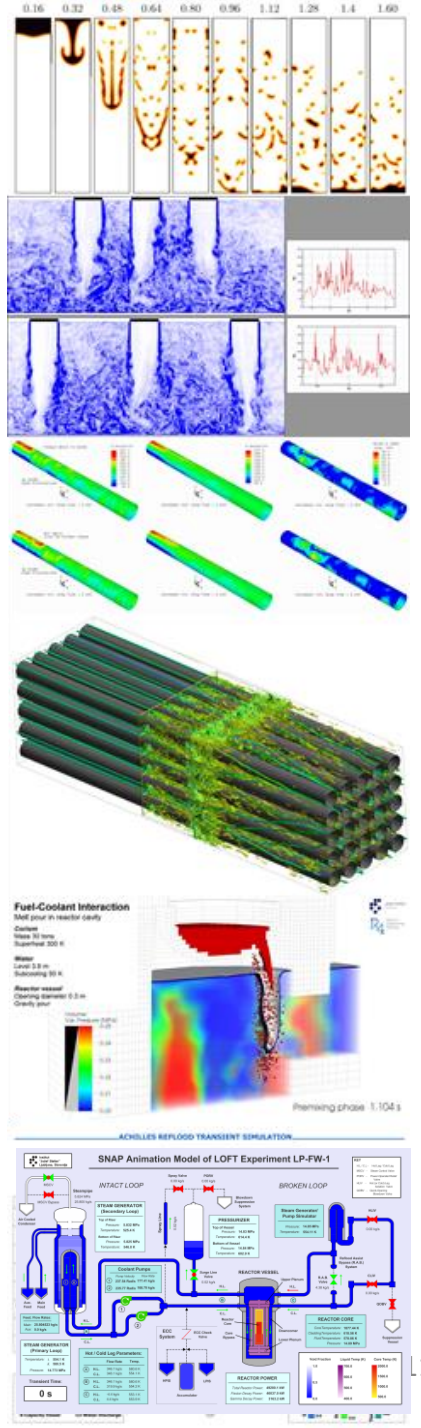
Main Research Activities
Reactor Engineering Division (R4)

(related to basic nuclear safety functions)

- ✓ Termal hydraulics (cool)
- ✓ Ageing of materials, integrity of components (contain)
- ✓ Reactor Physics @ F8 (control the chain reaction)

- ✓ Severe Accidents (involving core melt)
- ✓ ~~Probabilistic Risk Assessment~~ Risks & predictions of COVID-19

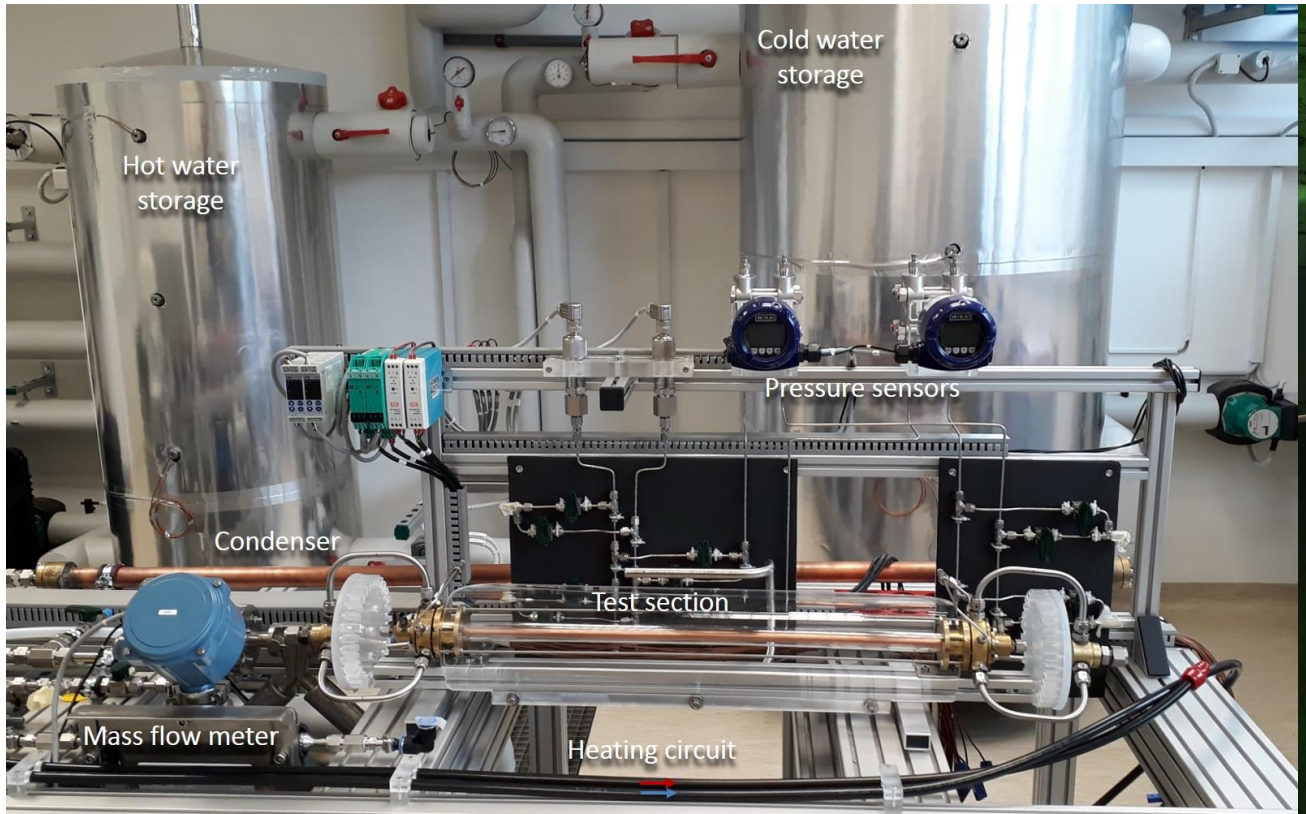
- ✓ Heat transfer, integrity of components and safety of fusion facilities

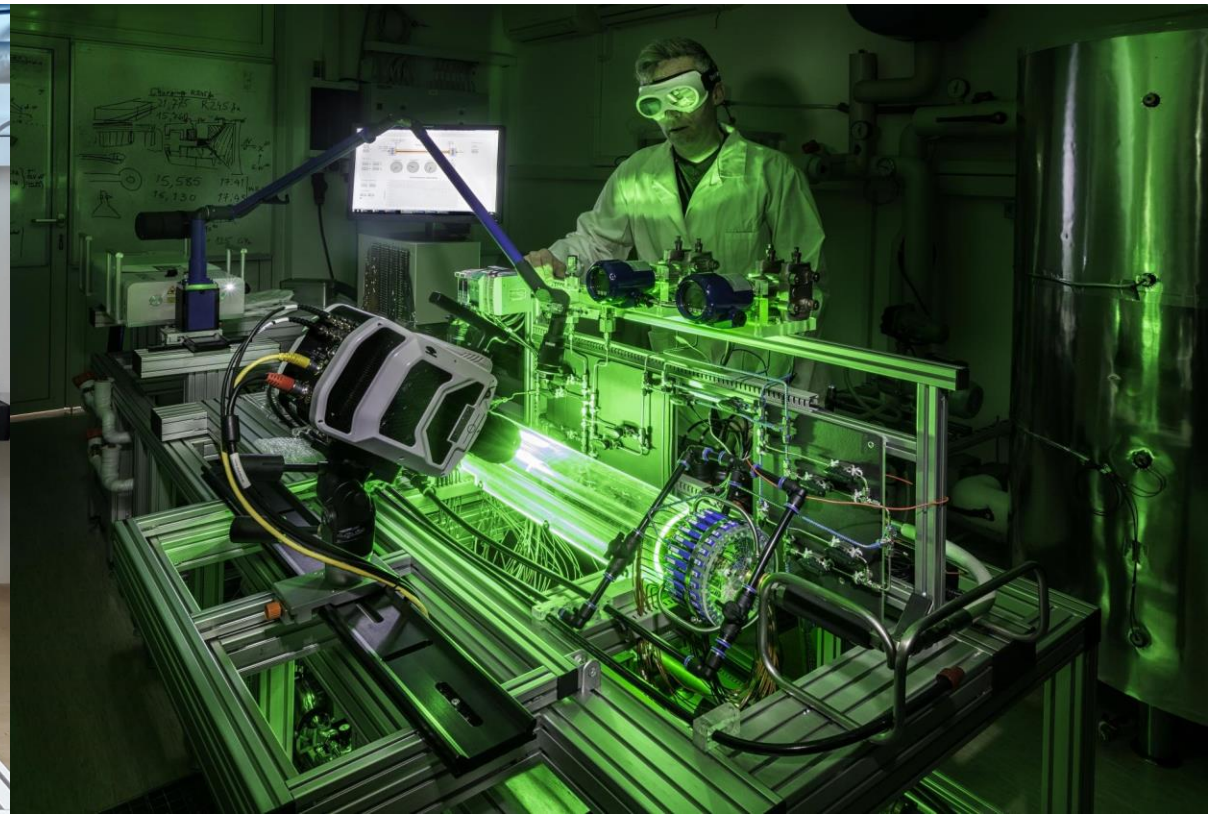


Main Research Activities (Experimental)

THELMA Thermal-Hydraulics Experimental Laboratory for Multiphase Applications

Participation in experiments in variety of EU projects, also China





Roles of the Jožef Stefan Institute

ETSON | EUROPEAN TECHNICAL SAFETY ORGANISATIONS NETWORK

Technical and Scientific Support to the Regulatory Body

- Nuclear safety
- Radiation protection

Support to licensing: strong focus in the past.
With time, focus was shifting towards research (curiosity)

Higher Education

- Nuclear Engineering (M.Sc., Ph.D.) @ University of Ljubljana
- Energy Technologies (B.Sc., M.Sc., ,Ph.D.) @ University of Maribor

enen european nuclear education network

Co-funded by the Erasmus+ Programme of the European Union

SARENA

IMT Atlantique Bretagne-Pays de la Loire École Mines-Télécom

LUT Lappeenranta University of Technology

Nuclear vs Nuclearized Experts?
(European Commision, EHRO-N)

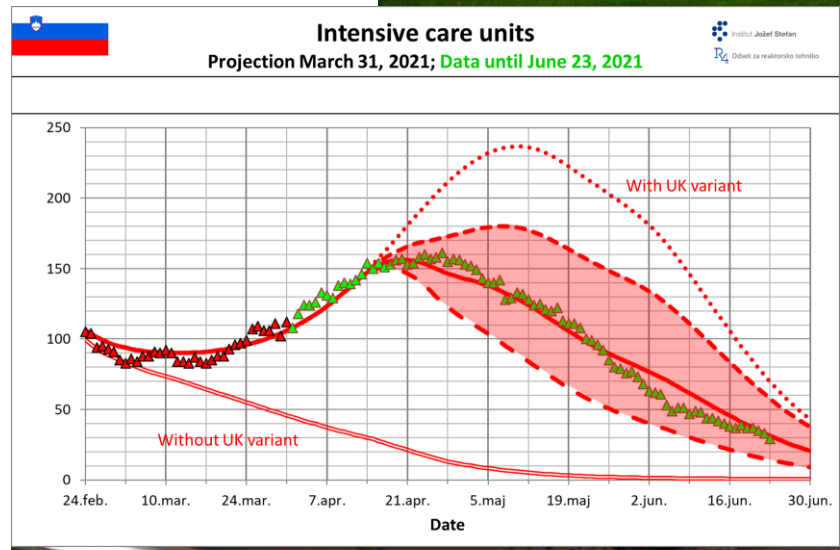
Roles of the Jožef Stefan Institute

Professional Training

- Milan Čopič Nuclear Training Centre (ICJT)

Communication of Science

- Primary and high school pupils: ICJT & TRIGA
- Mainstream media: senior and junior researchers
- COVID19



Signature of the EU SMR Declaration

Brussels, April 4, 2023

Prof Csilla Pesznyak
President ENEN
BME, Budapest

Mr Yves Desbazeille
Director General
Nuclear Europe
Brussesls

Ms Mariya Gabriel
EU Commissioner
for Education,
Research & Innov.

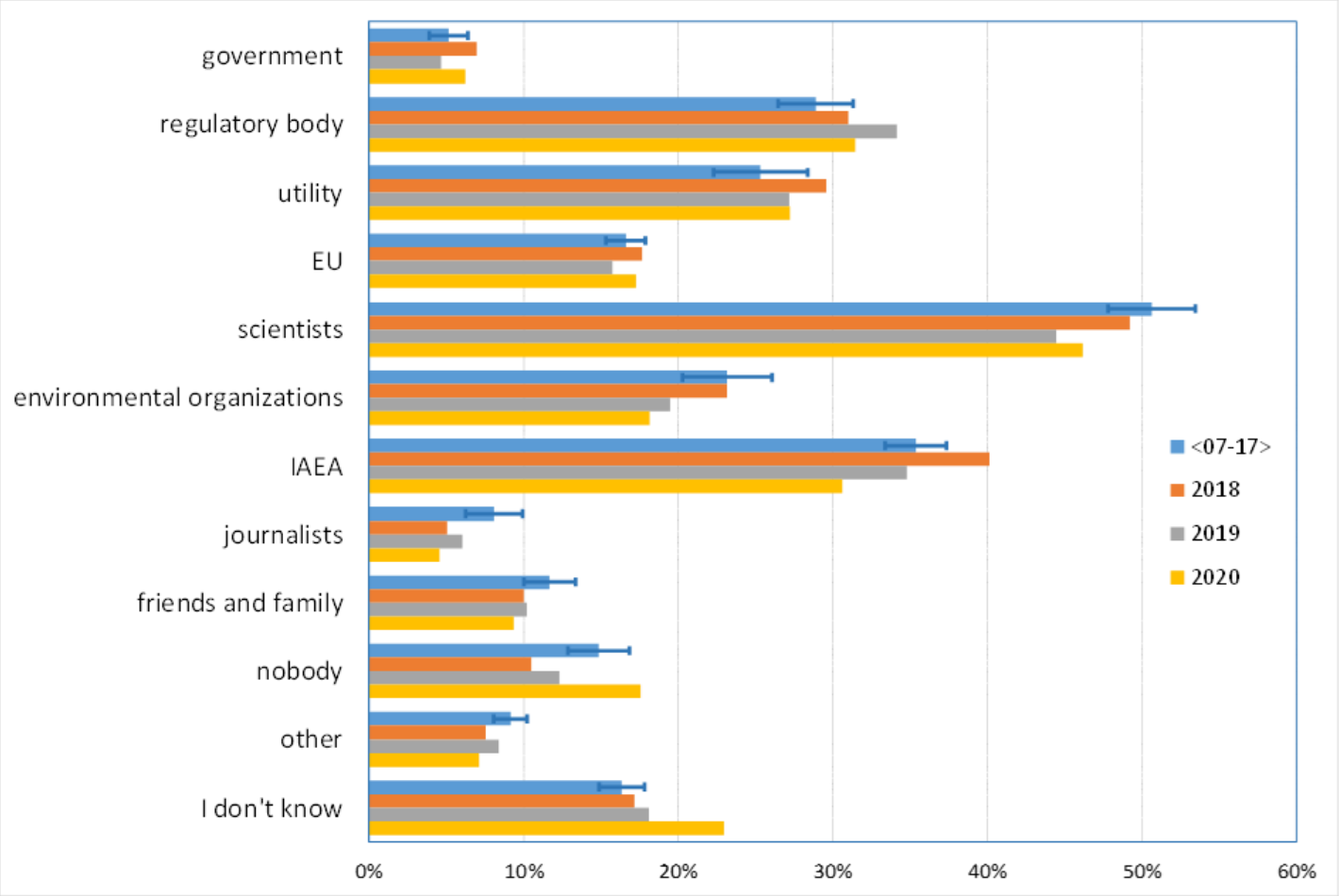
Mr Bernard Salha
President SNETP
VP EDF, Paris

Prof Leon Cizelj
President ENS
JSI, Ljubljana

Outreach

Public opinion about nuclear energy – poll 2020

Which 3 of the following would you trust to give information about nuclear safety?



Expertise
AND
Credibility

Summary

Nuclear power plant is with us for a century or more

- Huge advances in science, tech and social science
  - E.g., fission was discovered 85 years ago, in 1938
- Research instrumental in co-creating and preparing for possible futures

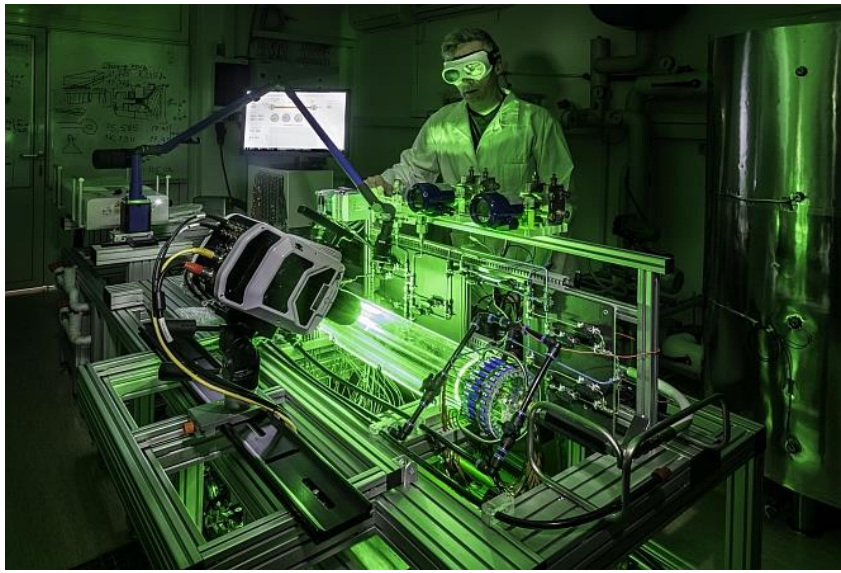
JSI remains committed to the world class excellency in:

- Research
- Higher education and professional training
- Technical and scientific support to the regulatory body
- Communication of science

Outlook

Research based (=active) approach to long-term independent knowledge on nuclear science and technology (**nuclear country!**)

- New research reactor
  - Research towards small/modular and advanced reactors
  - Preparations for construction of new nuclear units
  - Enabling decommissioning of TRIGA and Krško NPP
- Further developments of thermal hydraulics laboratory
  - Two-phase flows
  - Passive (safety) features
- Strong international project portfolio
  - CEA
  - EURATOM, OECD/NEA, access to research infrastructures
- Open research infrastructure for industry to:
  - Support R&D in energy (and other) technologies
  - Enable demonstration of new technologies (including reactors)



Thank you for your attention